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THE I.C.I. MAGAZINE

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The *I.C.I. Magazine* is published for the interest of all who work in I.C.I., and its contents are contributed largely by people in I.C.I. It is printed at The Kynoch Press, Birmingham, and is published every month by Imperial Chemical Industries Limited, 26 Dover Street, London, W.1. Telephone: REGent 5067-8

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Front Cover: *Industrial Widnes, 1950*, by F. P. Wilson.

The foreground is the site of one of the factories—that of William Gossage—mentioned in the article on alkali manufacturers.

OUR CONTRIBUTORS

ROBIN ALLEN, who contributes a prizewinning short story, is an old friend of the Magazine and will be remembered for his articles on the *Breeding of Goats and Old Cheshire*. Works Manager at the Lostock Works of Alkali Division since 1934, he joined Brunner, Mond & Co. in 1922 after serving throughout the first world war in the R.N.A.S. He has published a short history of Cheshire and a book of short stories.

WILLIAM FALLOWFIELD, Secretary of the Rugby League, knows well both the League and Union games, the pros and cons of which he discusses in a provocative article. At Cambridge University and later with the Northampton R.U.F.C. he was an enthusiastic Rugby Union player. Then during the war, while serving as a pilot with Coastal Command, he became converted to the League game, becoming their secretary in 1946 at the age of 31. Since then he has watched the attendance for the Wembley Final rise from 55,000 to 95,000. But the achievement of which he is most proud, he says, is the rewriting of the laws of the League game into a simple indexed form.

F. H. PERKINS, I.C.I. Education Officer, needs no introduction to readers. An authority on *Training Within Industry*, which developed out of his visit to the United States during the war on behalf of the Ministry of Labour, he has since 1946 been directly concerned with I.C.I. policy on the training of foremen. Next month Mr. Perkins will conclude his series of articles on I.C.I. training schemes with one on *Training for Management*.

DR. D. W. F. HARDIE may be ranked among our contributors, since the article on early alkali manufacturers is a digest of the opening chapters of his forthcoming book, *A History of the Chemical Industry in Widnes*. Dr. Hardie has a wide range of intellectual pursuits. He has written a Breton grammar published by the University of Wales. This is a recognised text-book. He has also published three successful detective novels. He joined the Research Department of General Chemicals Division in 1933 after taking a first at St. Andrews University in Chemistry.

The Trainin

by F. H. Perkins (I.

Just what goes on in a foremen's training courses? I.C.I. Education Officer tells you right inside the setting of a typical course, studies of one in action. They come to you graphs could have been obtained in any other

I RECEIVED my training as an apprentice under the supervision of a number of foremen. The characters and methods of these men were always matters of very lively interest to me, more particularly so after my experience in the foundry, where "old Joe" had clearly decided that in the matter of sand shovelling and hand-ramming youthful energy should be fully exploited.

Although it was my job during these years to master the mysteries of a trade and not to assess the qualities of a good foreman, nevertheless, in more recent times, I have found that these early experiences have helped me to appreciate the responsibilities that foremen carry, and how much depends upon them. They were certainly a power in their own land, and although their methods varied very widely, they all possessed an honest-to-God attitude to the job, a high sense of responsibility, a sound practical ability, and a willingness to help those who were prepared to help themselves. As far as I know, they had received no special schooling for their job. They had risen from the bench or machine, first of all to the position of under-foreman, and then, after years of conscientious endeavour combined with a bit of good luck, to the position of foreman of the shop.

Some years later I found myself with production responsibilities which involved the direct control of a number of foremen. The setting was a small engineering works in the heart of Moravia, and the foundry was my special responsibility. Here Foreman P— was the autocrat in possession, and authoritarianism had no competitor so far as he was concerned. Everything, apart from a few matters of overriding policy on wage payments and production programmes, was in his hands. Any disagreement with one of his workers left little doubt as to who was in control. It was settled by a castigation that reverberated throughout the building, but caused little stir apart from the individuals directly concerned, for the majority of employees had become well accustomed to this form of joint consultation. There must be no illusions in regard to P—; he knew his job. He had come up the hard way himself, and his men knew it too.

But the business was expanding and the job was becoming more than P— could manage, although he was in no way ready to concede this point. He started early, and he worked late; quality of production was good, but higher and more economical production was required, necessitating alterations in organisation and method. Many foremen have found themselves in a similar position as a result of the revolutionary changes that have taken place in most industrialised countries since the turn of the century.

My own experiences, therefore, and my subsequent concern with foremanship training, both in this country and in the

g of Foremen

C.I. Education Officer)

g course? And what is the object of these in this article. In order to bring the reader we asked a photographer to take camera mainly from Billingham, but similar photo-Division providing courses of this character.

United States, have made me realise not only what the nature of this change has meant to foremen themselves, but also the extent of the responsibility that now rests on the shoulders of management in assisting the foreman to fulfil his new role without losing the pride and satisfaction that he had achieved in the past. The modern conception of good foremanship places a premium on team-work as distinct from individualism, on leadership as distinct from autocratic power, on skill in the use of modern management techniques as distinct from craft proficiencies.

These considerations have led us in I.C.I. during the past few years to place increasing importance on the selection and training of those destined to fill supervisory positions, and although organised training can never be regarded as a complete substitute for what must be acquired by the hard road of experience on the job, much can and has been done to help foremen to obtain more rapidly this wider knowledge and understanding that their new role demands.

Every Division which has introduced organised training schemes has developed, quite rightly, its own solution to its own problem. It is therefore impossible to describe the existing activities in detail. There are, however, certain common features, and I wish to refer to these quite briefly.

There is a general acceptance of the fact that the first step up to a position in charge of others represents a major change in the character of the job. Abilities that have enabled men and women to be good craftsmen or good process workers are not necessarily those that are now required for success in a supervisory capacity. To any of us undertaking this step, the natural questions in our minds will be: "What sort of individual am I expected to be?"; "Am I expected to follow closely the example of foremen and chargehands for whom I have worked, or am I expected to develop an individuality or method of my own?"; "What are the basic requirements?"

It goes without saying that the foreman is expected to have a sound knowledge of the work with which he and those he supervises are directly concerned, and if the extent of that knowledge is insufficient, ways and means are provided by which the additional knowledge can be acquired. He welcomes guidance on the nature of his authority and responsibility, and although it is not always wise to define these matters too rigidly, some indications are given, and it is recognised that the knowledge that enables a man to know where he stands will help him to build up his confidence and to avoid mistakes. Apart from general training activities of this character, which I will refer to later, the Company has adopted very widely the Ministry of Labour's "Training Within Industry" scheme, which directs attention to the development of certain personal skills which are considered of importance to foremen and supervisors generally.



A TYPICAL SCENE DURING A FOREMEN'S COURSE (General Chemicals Division). The instructor, sitting at the head of the table, leads a discussion in which the practical experience of the individuals in his group is brought to bear on the particular problem under review.



A POINT IS ILLUSTRATED ON THE BLACKBOARD. *Arthur Finch, Technical Sales Services Manager at Billingham Division, shows the organisation of his department by means of a diagram.*



THE PRACTICAL PERIOD. *Norton pose of training. Here the foreman with*

There are three T.W.I. programmes. The first programme develops the skill of instruction. The hall-mark of a good instructor is his ability to analyse the way in which the job should be done, and to impart the necessary instruction with clarity and simplicity. The second develops the questioning attitude, and a keenness to think quickly and effectively about improvements that can be made in work methods. The Company encourages suggestions from employees, and the foreman is in a unique position to spot the possibilities for improvement. Finally, the third programme emphasises the foundations of good human relationships and the methods that should be used in dealing with the day-to-day personal problems that inevitably arise.

The chief merit of these three T.W.I. programmes is that they clarify ideas and establish a certain standard of performance. They are not in any sense lecture courses—there is no classroom atmosphere. They take the form of a small group conference (of no more than eight or ten people at a time) where ample opportunity is given for discussion and practice on problems of common interest. It was T. S. Eliot, however, who said "Between the idea and the action falls the shadow," and the translation of precept into practice may sometimes prove long and arduous. Foremen have welcomed these programmes, and there can be little doubt that the instruction has been taken very much to heart.

The T.W.I. programmes are basic in regard to the "skills of supervision" but as I have already mentioned, much has been done in I.C.I. in recent years to organise training courses for both new and established foremen to give them the additional knowledge and the broader outlook they may need in regard to the Company's policies and practices. These longer full-time courses have now become a feature of the training activities in most Divisions, and we cannot do better than take a look at one of them and see for ourselves what is actually



THE DISCUSSION CONTINUES DURING TEA INTERVAL. *Opinions shift as instructor sums up after free give-and-take of*



House Laboratory at Billingham has been specially equipped for the purman is able to study some of the basic chemical principles of processes which he is already familiar in the plant.



the argument is thrashed out. Discussions of this kind, in which the opinions, are a daily feature of the course.

happening. Here again we must remember that there is no standard pattern throughout the Company, but we shall be able to get some idea of the character of these courses.

The setting is a small conference room—right in the heart of the works or perhaps in an outside building where those attending the training course are less likely to be disturbed. There is a large table and comfortable chairs—it looks rather like a normal business meeting; there is a blackboard and a few wall charts, but certainly no classroom atmosphere. The Education Officer or a member of his staff is looking after the course, and we see a group of eight or ten people; their names and departments are well illustrated on the table, and they represent a wide cross-section of the various departments of the works. This particular group is of older-established foremen and they may be process foremen, engineering foremen, or a mixture of both; but a group might consist of younger men under consideration for appointment as foremen. We may ask how instruction can be given to men with such a variety of background and experience. We are told that, apart from certain periods of technical instruction, where some grading may be necessary, a great part of the work is done by drawing out the views and experience of those present in the group.

The wider and the more extensive that experience can be, the more useful and helpful the discussions become. Most of those attending have had little previous contact with each other, and in some cases possess little knowledge of the other fellow's job. During the time they are together—and this particular course may be one of some ten or twelve weeks' full-time duration—they change from individuals, not knowing just where the other man will jump, into a well-adjusted, well-balanced group in which each participates according to his own abilities. Respect for each other's views grows, help and patience are forthcoming for the younger and more inexperienced; there is merciless treatment for anything that lacks sincerity or genuineness, but good humour always prevails.

At this stage we question whether a long course of this description, so different from the normal job, does not create a mental weariness as it proceeds, and we find our answer in



EXCHANGE OF VIEWS BETWEEN INSTRUCTORS. Major Bansall, Billingham Division Education Officer (left), makes a point with Mr. Hutchinson, his instructor on the foremen's course (right), while Mr. Hunter, the Alkali Division instructor (second left), looks on with a critical eye.



LADIES' DAY. Towards the end of each course at Billingham the wives and children of foremen are invited to tea.

the variety of activity in the programme. Talks and discussions are interspersed with practical periods in a laboratory and visits to works. In some cases a member may be assigned for a few days to a foreman in another department where he is expected to analyse quickly the general nature of the other foreman's job, to think constructively about it, and to put any ideas that occur to him in the form of a short report—a very delicate operation; but a training scheme that can engender this flexibility of approach and spirit of mutual helpfulness is working along the right lines. In another case several members of the group may be assigned a particular works project.

There are many other questions we may ask; for instance, "Who gives the talks?" From the programme we see that quite a number of senior officials are taking part; a talk on the "History and Organisation of the Company, Division and

Works" is given by one of the managing directors, on "Personnel Matters" by the Personnel Director, on "Labour Policy, Trade Union Agreements, etc.," by the Labour Manager, on "Control of Production" by a works manager, on "Medical Services" by a works medical officer—indeed, a variety of subjects in which heads of departments and others take part. These senior people naturally find it difficult to fit this activity into their own jobs, but their willingness to do so, particularly on repeated occasions, is some indication of the importance they attach to this opportunity of personal contact and discussion with the foremen themselves. The benefit of these contacts is also stressed by the groups.

The last session of the course, in which the views of each man are sought, first in regard to the value he attaches to the course as a whole, and secondly in regard to any possible improvements, leaves no illusions as to the general appreciation. One foreman has written:

This course has helped me to appreciate the other fellow's job and his point of view; it has given me a wider knowledge of the Company's policies and how the various service departments operate. I now realise much more fully the functions that others have to fulfil and how necessary co-operation is in order that a great industrial concern shall run smoothly and efficiently. Above all, I feel better equipped for my own job and the day-to-day problems that arise. I am grateful for the opportunity.

His statement is typical.



A FEW MOMENTS' RELAXATION. Another effort to catch the instructor out with a googly.

I.C.I. NEWS

LORD MCGOWAN VISITS THE VICTORY CLUB

Lord McGowan, accompanied by Sir Frederick Bain, Deputy Chairman I.C.I., visited the Victory (Ex-Services) Club, 73-9 Seymour Street, W.2, on 5th July. Lord McGowan has always shown keen interest in the club since the idea was conceived in 1944 of expanding the old Veteran's Club (later the Allenby (Services) Club) into a large first-rate West-End club for ex-Service men and women, which in Mr. Churchill's words, would be both "a memorial to fallen comrades and a tribute to those who returned."



The Victory (Ex-Services) Club

In 1945 the I.C.I. Board sanctioned a grant of £5000 payable over five years for the general purposes fund of the club, and since Lord McGowan's recent visit, when he expressed unqualified approval of the premises and the

facilities available for members, a further grant of £2500 has been given to the club by the Company. Of this, £1000 has already been paid. During Lord McGowan's visit the committee reported to him the remarkable progress made by the club since it opened on 15th September, 1948. There are now more than 18,000 members. The 210 beds are almost always full. A special feature of the club's activities is reunions of ex-Service organisations. These are so popular that bookings are made up to twelve months ahead, and even these demands cannot always be met.

The club, which is within a few minutes' walk of Marble Arch, is open to all ex-Service men and women, irrespective of rank. The existing premises provide lounges, ladies' rooms, restaurants, games and billiard rooms, a ballroom, bars, an ironing room and 210 comfortable bedrooms at prices ranging from 5s. to 9s. a night. The period of stay is at present limited to ten days. The membership subscription is 10s. a year.

Many formations, units, associations and individuals have contributed towards the cost of parts of the premises, and many of the rooms have metal plates giving the identity of the donors. The Eighth Army has endowed the ballroom and some of the bedrooms. A dining-room has been provided by the Royal Navy and a tea lounge by the R.A.F. One of the lounges was donated by the 7th Armoured Division (the "Desert Rats"), another by the W.V.S. The cost of endowing a bedroom has been worked out by the architects at £500 for a single and £750 for a double room.

The club now finds its present accommodation inadequate and plans to expand. Additional rooms for ex-Service reunions and other functions are needed, also double bedrooms for married members. A blitzed site next to the club, ready to build on, has been acquired and the funds are being appealed for to complete this project.

Joining the club, which would be useful to many ex-Service members of I.C.I., whether resident in London or visiting, is simple, and a note to the secretary will bring the desired information. The club committee would welcome the opportunity of enabling I.C.I. ex-Service personnel to enjoy the benefits of their unique club, which owes so much to the interest and support of the Chairman and main Board of the Company.

Sir William Coates

Sir William Coates, a deputy chairman of I.C.I., retired from the Board of the Company on 30th September at the age of 68. He will be greatly missed by his many friends in the Company.

He joined Nobel Industries Ltd. as secretary of that company in October 1925 in succession to Sir Josiah Stamp, and became the first Treasurer of I.C.I. on the formation of the Company in 1926. He was appointed a director in July 1929 and was a member of the Finance Committee from that time until March 1938, when he became chairman of the Finance Executive Committee. From January 1944 to April 1948 he was Finance Director of the Company. Sir William was appointed an I.C.I. deputy chairman in July 1945.



Sir William Coates

Sir William was also a director of Canadian Industries Ltd. from December 1945 until April 1949. Since December 1934 he has been on the board of Thames House Estate Ltd., from which he has now resigned with effect from 30th September.

He has been a director of Westminster Bank Ltd. since March 1941 and was appointed one of its deputy chairmen in August 1950.

ALKALI DIVISION

Mr. T. A. Mason

Mr. T. A. Mason, the Production Director of the Alkali Division, resigned from the Company on 31st July, after 27 years' service, to take up an appointment as Technical Director of the Clayton Aniline Company.

Mr. Mason joined the Research Department of Brunner, Mond & Co. in 1924 on completion of his academic training at Oxford University. Within two months of joining the Company he transferred to Winnington Works. He was appointed Manager of Winnington Works at the beginning of 1932 at the early age of 30. The first few years of his manager-ship were extremely arduous for him, as, in addition to the

problem of managing the works and maintaining production while the works were under reconstruction, he took a keen interest and an active part in devising many technical improvements. He was appointed a delegate director in April 1939.

As an officer in the Auxiliary Air Force Mr. Mason was called up for service on the outbreak of war, but the programme of work undertaken by the Division in the construction and management of agency factories necessitated his return in 1940. He was appointed Production Director on 1st January, 1942, in succession to Mr. W. H. Demuth.

Mr. F. Steadman, formerly head of the Technical Directors' Department, succeeds him as Production Director.

Winnington Works Safety Week

Although most people know of the campaign for greater safety on the road, the general public as a whole may not be aware of the campaign for greater safety in industry. More than 800 people are killed every year and over 200,000 suffer injuries which incapacitate them for more than three days. These figures can only be reduced by industry's own efforts.

I.C.I. has made great strides in reducing the number of accidents among its workers. Although Accident Prevention, as it is called in industry, is held by I.C.I. to be an integral part of production, occasionally a special effort is called for to highlight it and emphasise its importance. Such an effort was the Winnington Safety Week, held from Monday, 2nd October, to Friday, 6th October.

During the week, which set out to be the best Safety Week ever held in this country, every effort was made to stimulate increased interest in safety. A special Winnington Works newspaper called the *Daily Look-out* was published every day. Each man got his copy as he arrived at work. The paper contained news of the previous day's happenings in the works, articles on safety, photographs and cartoons. Another innovation was a special safety competition. Entry was free to any person on the payroll of Winnington Works and the prizes totalled £100.

Each day loudspeaker broadcasts were made through the works broadcast system and by loudspeaker van. There were lectures and discussions by foremen and supervisors.

A Pigeon-fancier Looks Back

A perusal of local "homing" results always shows Mr. Martin McHugh's birds as being among the leaders arriving home. Mr. McHugh, who was first employed by Brunner, Mond & Co. in 1920, is a shift boiler attendant at Wallerscote. He was initiated in homing at the age of 10 and has 45 years' practical experience. His birds have won races over all distances.

On one occasion one of his birds arrived home from Jersey 51 minutes ahead of any other in the mid-Cheshire area, and last July a bird entered by him flew from Nantes (421 miles) in less than nine hours—at nearly 50 miles per hour. Mr. McHugh is a founder member of the Weaverham and District Flying Club.

There are about fifteen pairs of birds in the McHugh loft. The favourite breeds are Sion, Bricoux and Vanderbilt. Mr. McHugh advises prospective breeders, when selecting homers, to look for a good clear eye, a well-shaped head and an evenly balanced body. Reflecting on pigeon racing over the last forty-five years, he thinks competition is much keener but



Mr. Martin McHugh

that the birds themselves are no stronger or more advanced. This he attributes partly to two world wars, during which no cross-Channel racing was permissible. There is consequently a lack of the trained "pilot" birds, which are so essential in all races.

DYESTUFFS DIVISION

Dr. G. Robertson

We regret to report the death on 4th September of George Robertson. Failing health had necessitated his resigning the position of Assistant Works Manager at Trafford Park some two years ago, although he carried on in the laboratory until June of this year. An informal presentation of a bookcase and table lamp from his colleagues and friends had only recently been made to mark his intended retirement to St. Andrews.

"Doc," as he was affectionately called, was born near Dundee, the son of a village dominie. At the university in the "old grey city by the sea" he graduated M.A., B.Sc., with distinction in chemistry. As a result he was awarded a Carnegie Scholarship and later a Fellowship for research. During World War I he was one of the team of chemists under Irvine and Haworth who developed methods of preparation for scarce drugs, such as novocaine, previously manufactured only by the Germans.

When he obtained his Ph.D. degree he joined the staff of the Wilton Research Laboratories, founded by Lord Wilton to carry out research on dyestuffs as a business concern. In 1920 the Wilton team was taken over by the British Alizarine Company as a nucleus for its Research Department. The British Alizarine Company was in turn taken over by I.C.I.

Dr. Robertson was popular throughout the works. His

modest personality made him very easy to approach and his interest in his fellow-workers encouraged many to seek his advice and help; he was at all times ready to serve others without thought for himself. He will be remembered, too, for his long service on the Works Council and as chairman of the Safety Sub-committee, the Benevolence, Charities Fund, Children's Party and Dramatic Section committees. His presence will be greatly missed among his colleagues and friends, but memories of his many gracious acts of kindness will long remain.

First-aid Team Success

Huddersfield Works First Aid Team was awarded the Howarth Rose Bowl in a competition at Greenhead Park, Huddersfield, on 12th August. Nine other teams, drawn from the St. John Ambulance Brigade, Police Forces and works teams within a radius of 20 miles of the town, took part in the competition, which was held in connection with the borough summer entertainments. Huddersfield Works team won by one point over Bradford City Police.

The team (Messrs. Clarke, Miles, Radcliffe, Nicholls and Greenfield) was chosen from the people who sat for the first-aid examination at the works after attending training classes during last winter.

The Beadle of Holsworthy

*Pray silence for the King's excisemen !
Mine host !
Four men of Wessex here this night
With payment on ye nale
To sample that ye fain would sell
So come, produce your ale.*

With this verse chanted in stentorian tones, the Town Crier and Beadle of Holsworthy in Devon announces the visit of the Ale Tasters in each Inn and Tavern of the town, during their Annual Fair.

John Manning, of the Huddersfield Works of Dyestuffs Division, has since 1927 held this ancient office, the origins of which date back 800 years. For 50 weeks in the year he is a fitter, in the Mechanics Shop.

During his annual holiday he is kept very fully employed in his home town of Holsworthy since, in his official capacity, he has many tasks to perform during the Fair. His full titles and duties are Town Crier, Beadle, Warden of the Ale Tasters, Announcer of the Pretty Maid's Money, and Keeper of the Clink.

Firstly, as Town Crier, it is his duty to make "in treble forte voice" all Publick Announcements (for this he receives, or, at least, he should receive, a fee of 1s. 6d.) and to read the ancient charter proclaiming the opening of the Fair. This charter for Manorial and Fair Rights was granted by Henry II in the year 1154. It has to be declaimed each year on the opening day "at 8 o'clock of the forenoon under the Great Tree of Holsworthy."

As Beadle, his duties mainly consist of preceding Royalty if they should visit the town and, what is likely to be more important, helping Municipal Officers to Maintain the Peace.

During the Fair, any reputable townsman used to be permitted to brew and sell ale. And at the many houses where this was done the vendor had to hoist an ivy bush over the door as a sign that rest and refreshment were available there for a

man and his horse. The duty of the Ale Tasters was originally to ensure that the ale had been properly brewed and was good to drink. They wore leather breeches and if suspicious that cheap molasses instead of expensive sugar had been used for the brewing they would pour a sample on to a slate slab and sit in the puddle of beer for twenty seconds. If their leather breeches stuck to the slab they would deduce the presence of molasses and refuse permission to sell the ale. The convicted vendor was also fined by the Beadle. The Ale Tasters, of whom Mr. Manning is the Warden, still make their rounds and, needless to say, in addition to this scientific analytical test, the ale is also sampled by their palates, one pint at each house being regarded as the minimum permissible sample for each man.

The Pretty Maid's Money is presented at a unique ceremony



The Holsworthy ale-tasting ceremony

which may well have been one origin of the modern Beauty Competition. A committee of townsmen, including the Beadle and with the Rector as chairman, elects the Pretty Maid for the year, but the nomination is kept absolutely secret until a certain time when the townfolk gather round the church door. The fortunate Pretty Maid is then called out of the assembly and presented with a purse of fifty shillings in gold, or modern equivalent.

As Keeper of the Clink, Mr. Manning is nominally in charge of the town "lock-up." The name Clink may seem more like modern slang than the venerable name of an old building, but the name is actually very old and probably derives from the word "clinch." A similar building in the neighbouring town of Stratton, has the sign "Clink" executed in ancient wrought ironwork over the door.

Mr. Manning states that his worst task as Town Crier occurred with the sudden announcement of King Edward VIII's abdication. It was an important document, full of resounding titles and complicated legal phrases, which had to be cried through the town without any opportunity for a preliminary reading or rehearsal; a feat only possible for a really experienced announcer.

The present Crier's predecessors were Mr. George Slee, 1824-74, and his son Fred Slee, 1874-1927, a total of 103 years'

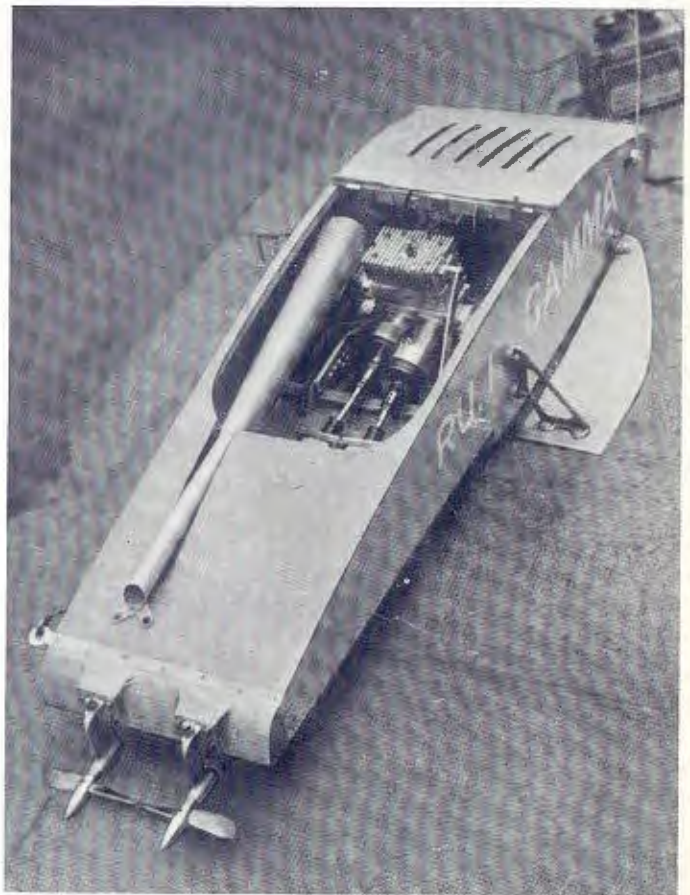
service from father and son. It is John Manning's ambition and earnest hope that he will be spared to achieve, at least, his half century as Crier and thus maintain the tradition of long service in these ancient offices.

(The "nale" referred to in the rhyme is a kind of stone bollard, still to be seen in Bristol and the West Country, upon which coins were literally struck, to signify the closing of a sale or transaction.)

GENERAL CHEMICALS DIVISION

Model Hydroplane Builder

Mr. "R. E." Mitchell of the Research Department is well known as a model hydroplane builder and racing enthusiast. During the winter he built a new hydroplane. He chose Class C (10 c.c. engine capacity), which is the smallest class in the competition. The models are consequently easier to transport to the various regattas. His model is unique in that it has two contra-rotating propellers. The engine is also of uncommon design. It is a twin two-stroke with twin crankshafts but has only one combustion chamber. The two crankshafts are synchronised by internal gears.



Mr. Mitchell's latest model hydroplane

Mr. Mitchell also raced his Class B (15 c.c. engine capacity) hydroplane. Here is his list of successes in five regattas:

Regatta	Class B	Class C
Bournville	2nd (43.6 m.p.h.)	1st (37.8 m.p.h.)
International, London	3rd (46.0 m.p.h.)	1st (41.5 m.p.h.)
Coventry	1st (47.6 m.p.h.)	1st (39.9 m.p.h.)
Altrincham	1st (43.9 m.p.h.)	2nd (38.3 m.p.h.)
Derby	1st (46.8 m.p.h.)	2nd (36.8 m.p.h.)

LEATHERCLOTH DIVISION

A Threefold Coincidence

Mr. A. F. Dyson (Leathercloth Division) gives the following account of a threefold coincidence which occurred recently when a party of Leathercloth engineers visited Southport and got mixed up with a presentation party from Northern Region.

"Ours was a cheerful crowd that gathered one Saturday in September. Our organisers had planned the trip well and the journey to Southport passed without hitch or deviation from schedule. Punctually at 12.25 we made our way along to lunch to the Lord Street Café.

"At 12.30 we introduced ourselves as Mr. Way's party and were shown our accommodation, a corner section of the main café, with just a few small tables, enough for the thirty of us. We prepared to sit down. Someone, however, mentioned I.C.I., and this caused the manageress to usher us upstairs into a much more inviting room, free from other diners and with the tables set out as if for a wedding breakfast. A telegram lay at the table head plainly addressed to A. Day. This surely could not be ours; we knew no one of that name, but the manageress insisted it was our telegram and could be no other's, so J. Way presumed a typographical error, opened it and was quickly reassured by the friendly message 'Best wishes for your outing. Have one on me—Lockyear.' This was splendidly received, and had Mr. Lockyear been present he would have been immensely pleased at his popularity. This was even more pronounced when the waitresses began to serve us with a Worthington each and declared that there was no mistake and that they had already been paid for.

"Everyone was happy and the excellent lunch was over when a slightly perplexed gentleman presented himself at our table and introduced himself as Mr. A. Day. So he existed after all. Moreover he had brought a party with him. They were fifty minutes late and theirs was a special presentation party, which had travelled all the way from I.C.I. Manchester Office, Distribution Department.

"Our organisers now faced a man whose table we had bagged, whose lunch we had eaten and whose very beer we had drunk. For the Lockyear of the telegram was not our supervisor of the Hyde Factory Boiler House but chief of the Manchester Office Distribution Department, a colleague of our new acquaintance, Mr. A. Day.

"We apologised profusely, although really we were not to blame, and our new friends of the other I.C.I. party took it in good part, accepting our replacement of the wrongly drunk beer. We left them afterwards wondering what would happen at teatime. We need not have worried; there were no further mistakes, our dining-room was the corner section of the main café, and as we partook of a good tea, from upstairs in our late vacated room sounds of laughter and applause reached us. Manchester Office, Distribution Department, with their organiser Mr. A. Day, were enjoying their presentation tea."

METALS DIVISION

New Tube Factory at Liverpool

The next twelve months will see big changes in the Metals Division's tube-producing organisation. The new 50-acre factory at Kirkby, Liverpool, will gradually absorb more and more employees as production there gets into its stride, and this development will naturally entail a redistribution of

activity in the Division's three existing tube plants at Witton, Smethwick and Salford.

On 4th September Mr. H. E. Jackson (chairman of Metals Division) welcomed members of the local council to the new factory, where production on a small scale was about to start. He explained that, while the site had been chosen mainly with the idea of "taking the work to the workers," Liverpool's docks would be a great advantage in importing raw materials and exporting finished tubes.

Kirkby would be the most up-to-date tube-producing plant in the world, Mr. Jackson said, with equipment larger and more powerful than any used elsewhere for similar purposes. The tubes produced, ranging in diameter from that of a pin to twenty inches, would help to supply many industries at home and abroad.

With the completion of the plant—which is expected to be in full production by 1952—the Broughton works at Salford will close down, bringing to an end nearly a century of specialisation in the tube industry. A proportion of key personnel from there will be transferred to Kirkby, to provide a nucleus of experienced workers in an industry new to the locality.

U.S. Scholarship for Engineer

Mr. W. N. Ismay, head of the Furnace Design Section of the Engineering Department at Kynoch Works, has been awarded one of the fifty travelling scholarships granted under the auspices of the American Economic Co-operation Administration. These scholarships are awarded to Honours Graduates in Science or Engineering with at least two years' industrial experience, who are thus enabled to study technology at American colleges and universities for one or two years.

Mr. Ismay left this country in August and will be studying furnace design in the U.S. for two years.

NOBEL DIVISION

Mr. Arthur Morris and Miss Iris Wyllie

We record with very deep regret that Mr. Arthur Morris and Miss Iris Wyllie, two popular members of Nobel Division staff, lost their lives in tragic circumstances on Sunday, 10th September. These young people, who were keen social workers and enthusiastic members of the Saltcoats Corps of the Salvation Army, had on Friday and Saturday been assisting at the Knockshinnoch Castle pit rescue operation by staffing a Salvation Army canteen.

In this pit disaster thirteen Ayrshire miners lost their lives and 116 others were brought to the surface alive through workings filled with poisonous gases after more than two days' rescue work. Returning home by car after doing work much praised by all who took part in the rescue, Mr. Morris and Miss Wyllie collided with a lorry and were killed. We extend our deepest sympathy to the bereaved parents.

Prizewinning Horticulturist

Perhaps one of the most successful of all the horticultural exhibitors at Nobel Division is Mr. Peter Hill, a joiner in Roslin Factory. This year he has had an imposing record of successes at several shows.

With eleven entries in the Liberton Horticultural Association Show in Class 2, which is open to gardeners and amateur

gardeners in Edinburgh and Midlothian, he gained nine prizes. He had three first prizes, five second, one third, and a special prize for potatoes awarded by an Edinburgh seedsman.

Mr. Hill also gained the first prize for pot plants at the Royal Caledonian Horticultural Society Autumn Show; and from his three entries in the cut flowers class he gained one third prize. He had six entries in the vegetable section which brought him a second and a third prize. His most inspiring performance, however, was in the Penicuik Horticultural Show, when with 31 entries he took 23 prizes, which included 12 firsts, four seconds, seven thirds and also a diploma for amateur gardening.

Champion Drum-Major

Drum-Major Eric Allan of Ardeer Factory Cadets Pipe Band won a championship this year at the Cowal Games, the famous Highland gathering held annually at Dunoon on the Firth of Clyde. He becomes for a year the holder of a gorgeous hand-carved mace set out with a spiral silver chain and decorated with small silver plates. Mr. Allan's name will appear on one of these plates and he will be in the company of the world's champion drum-majors, some of them the leaders of well-known military bands.

Ardeer Golfer's Success

Mr. Jack Cannon, the well-known Ardeer golfer, is a player who has not always had the extra bit of luck that often wins competitions. Recently, however, he had a thoroughly deserved victory in the Arrol Cup competition over the Prestwick St. Nicholas course. Among the entries were many Scottish amateur international players, so there is no question about the high standard of play. Jack Cannon won the award by three clear strokes and the present Scottish amateur champion was runner-up.

PLASTICS DIVISION

Award for Bravery

Mr. Albert Dyball, leading hand process worker on the 'Diakon' Plant, Billingham, received the bronze medal and certificate of the Royal Humane Society from the Mayor of Stockton at Stockton Town Hall on 5th September.

The citation accompanying the awards, which was read to the council by the Mayor, Alderman M. M. Kelly, J.P., stated that on 10th February Mr. Dyball was on his way home from work when he was told that a boy had fallen into the brook, which was in flood at the time. Thinking that the boy was in the water near Dundas Street, Mr. Dyball at once jumped in but found that the child must have been washed into Cuckoo Tunnel, a culvert which runs for about 230 yards under Stockton railway marshalling yards.

"At great risk to himself Mr. Dyball went into the tunnel for a distance of about thirty feet but could find no trace of the missing child," the citation reads. "When he tried to return, he found that he was unable to do so owing to the strength of the current. A rope was thrown to him by P.C. Brown, but this snapped, and Mr. Dyball was obliged to negotiate the whole length of the tunnel to save his own life. There were several dangerous bends in the tunnel, and it was only due to the fact that he was a strong swimmer that he was not swept away. There is no doubt that Mr. Dyball risked his own life in an attempt to save the child's life."

I.C.I. (CHINA) LTD.

Mr. A. V. Farmer (chairman, I.C.I. (China) Ltd.) and his wife recently gave a garden party at their house in Crescent Avenue, Shanghai, to 142 members of their staff. The guest



I.C.I. garden party at Crescent Avenue, Shanghai

of honour was Mr. C. W. Yih, who retired on pension in 1945 after some 30 years' service, in which he reached the position of Senior Chinese Adviser to the Company.

THE DECEMBER MAGAZINE

The December *Magazine* has an Eastern flavour. The first article tells the fascinating story of how, at the hands of A.C.C.I. Ltd., a synthetic oasis has been developed at Khewra, the Pakistan soda factory built in 1941 in the "howling wilderness" at the foothills of the Salt Range. Against this desert background there are today at Khewra gardens which, with their green lawns and fruit trees, rival those of our own country. They are illustrated with some lovely photographs.

Mr. Ronald Farquharson, I.C.I. Shipping Manager, returns once again to the theme of his China reminiscences, this time to write about his peaceful experiences in Korea in the distant days of the 'twenties, before Japan had invaded Manchuria. Alongside this article we have an unusual contribution in the shape of some vivid pictures of the rescue of a ship sinking in Arctic waters. The story is told by Captain Hardwick, now commanding one of the Nobel Division ships. At the time of the rescue he was in the employment of the Hudson's Bay Company.

Our other two articles are of a more serious and informative character. The "Glimpses into the Past" series is concluded by an article on the early dyemakers; and a most valuable and thoughtful contribution comes from the pen of Mr. Perkins, I.C.I. Education Officer, on training for management.

Information Notes will feature a full résumé of Dr. Fleck's paper on the discovery of workable deposits of potassium salts in north-east Yorkshire. There, in the Eskdale district, survey has disclosed at a depth of 4000 ft. the presence of at least 200 million tons of potassium chloride within the surveyed area of 12 square miles. At present Britain is entirely dependent upon imports from foreign countries, chiefly Germany, for supplies of potassium salts, which among other uses are a vital fertilizer in agriculture.

Water Treatment



Water, as we know it, is not just pure H_2O —it contains impurities. Depending upon the use to which water is put, these impurities may cause extensive damage—pipes corrode, scale forms inside boilers, or the washing of textiles may be impeded. The purpose of the Alfloc Water Treatment Service is to sort out these difficulties on the spot and to advise just how a particular water should be treated to suit the purpose for which it is needed.

WATER, always an essential commodity, is, in today's highly organised civilisation, necessary not only for the support of life and for domestic purposes but also to keep the wheels of industry turning.

But water in its natural state is not always fit for these purposes. For example, it contains "hardness," which prevents the formation of a good lather with soap, spoils the finish of materials in the laundry and textile processes, forms scale in boilers, resulting in overheating of the metal and wastage of fuel, causes deposits in pipe-lines, restricting the flow of water and increasing pumping costs, and spoils leather in the tanning process. Much time and money may be spent in cleaning pipe-lines and boilers which have become scaled. Water may also contain suspended matter, such as clay or silt, colouring matter that would produce a dirty finish in laundry or textile works, or micro-organisms, which can cause slime in condensers, weed-like growths in tanks and cooling towers and disease in human beings.

Difficulties associated with the presence of "hardness salts" are not even confined to natural water. The crystal-clear stream that comes gushing from the kitchen tap, which is certified by the local authorities to be pure and wholesome, also contains "hardness," dissolved salts and dissolved gases, which although innocuous to human beings can still cause trouble in industrial plants. Thus, as far as industry is concerned, even the water in the public mains may require further treatment before it can be used in a works.

Fortunately, most of the troubles caused by the impurities in water supplies can be overcome by correct chemical treatment, and I.C.I. manufacture many of the chemicals used for this purpose. In Great Britain alone many million gallons of water are treated with I.C.I. chemicals each day. Water treatment plays an important part in many industries in this country and indeed throughout the world. Railways and

power stations depend on water treatment to keep boilers free from scale and corrosion. Steamship companies, too, take advantage of the benefits of water treatment in ships' boilers, and many vessels whose names are household words regularly use I.C.I. chemicals in their boilers.

The heavy industries, such as steel and coal, depend on steam for power purposes and employ water treatment to keep boilers and cooling circuits in good shape. On the process side, the tanning of leather, laundrying, and many aspects of the textile industry could not function if water treatment was not available to purify the water used in these processes.

The importance of water treatment to the life of the community and to industry cannot be too highly stressed. It is true to say that there is scarcely a commodity or a service which is used in everyday life which does not depend in some way on water treatment. But water treatment is not a simple matter, and the methods of treating water are as varied as the waters themselves.

One water may need treatment with lime, soda ash and sodium aluminate in a softening plant to produce a treated water suitable for, say, textile processes; another supply may call for clarification (using sodium aluminate or sodium silicate) to remove suspended and colouring matter, followed by sterilisation (using chlorine) to make it fit for a domestic supply; a third supply may need treating, to prevent scale in boilers, under conditions which prevent the installation of a softening plant.

It not infrequently happens that within one works there are a variety of water supplies which have to fulfil several needs. For example, hard water may be available in a well, with a soft brook water available as an alternative. One of the two waters may be required for boilers and for cooling condensers, and the other perhaps for process purposes, each of which requires a different type of treated water.

The complexities which can arise in dealing with a water

treatment problem raise the question, "How can the best chemical treatment be selected, and who shall be responsible for making the selection?" The only satisfactory method of dealing with the situation is for each problem to be studied on site. This work is undertaken by the Alfloc Water Treatment Service, which is responsible for giving technical advice on the use of water treatment chemicals. These are not confined to the specialised 'Alfloc' products but include many other I.C.I. chemicals used for water treatment.

The term 'Alfloc,' which incidentally is a registered trade mark, is derived from the words "aluminate" and "flocculation." Sodium aluminate, one of the first chemicals used as an auxiliary to water softening with lime and soda, produces "floc"—a sort of snowstorm effect—in the water. The significance of the name today, however, is much wider. 'Alfloc' is now a system of treatment and a technical service, not only in this country but also in many countries abroad.

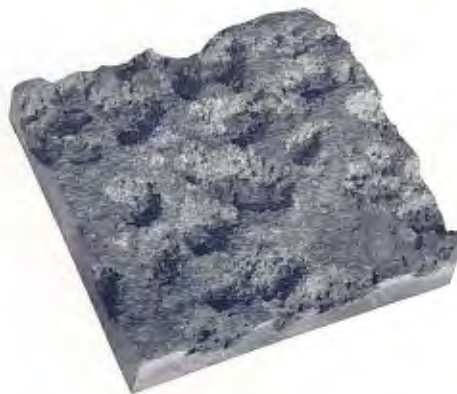
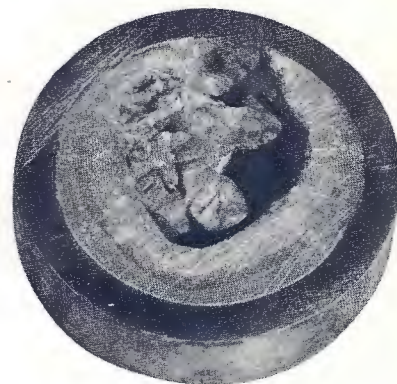
On receipt of an enquiry for water treatment chemicals, or in response to a call for assistance, an 'Alfloc' technical representative visits the plant and carries out a full survey of operating conditions. The survey includes analyses of waters on the site by means of transportable testing kit. If necessary, additional samples of water, boiler scale, etc., are sent to the 'Alfloc' laboratory for more detailed examination. A comprehensive technical report is then sent to the customer detailing the data obtained during the survey, the recommendations for correct chemical treatment, how the treatment should be applied and controlled, and the materials to order to put the treatment into operation. If the recommendations of the Alfloc Water Treatment Service are adopted, the 'Alfloc' technical representative calls at the works to assist in starting up the treatment and to train the works personnel in making the necessary control tests. In addition he calls at regular intervals to make his own independent check tests and to ensure that the chemical treatment is being used to the best advantage.

Since water is an essential commodity in almost every industry and service, either for steam-raising or for process, there is scarcely an undertaking which is not represented among the 'Alfloc' customers. In Great Britain alone they number some 2000, and the list includes collieries, steelworks, British Railways, waterworks, dairies, breweries, steamships (both Merchant Navy and Admiralty), hospitals, gas works, power stations, tanneries, potteries, laundries, textile mills and glassworks. To meet the varied needs of these and other uses there is a range of no fewer than twenty different water treatment chemicals available. These are modified and added to from time to time as circumstances and technical developments dictate.

Because of the industries they serve, most 'Alfloc' technical representatives are located in the main industrial towns and seaports, but in Great Britain they operate under the jurisdiction of the I.C.I. Area and Regional Sales Offices. The 'Alfloc' technical staff in the Regional offices collate the work of the 'Alfloc' technical representatives within each Region and deal with technical correspondence, enquiries and the like. Behind the Regional organisation there is the Central Control organisation at South Kensington, which handles special problems and new developments.

The rapid growth in the size and prosperity of the Alfloc Water Treatment Service since it was completely taken over by I.C.I. towards the end of 1938 is illustrated by the fact that the overall tonnage of products sold has more than trebled.

(RIGHT) Scale formation blocking a pipe-line and (BELOW) boiler metal pitted from corrosion. These are two of the major problems in boiler plants.

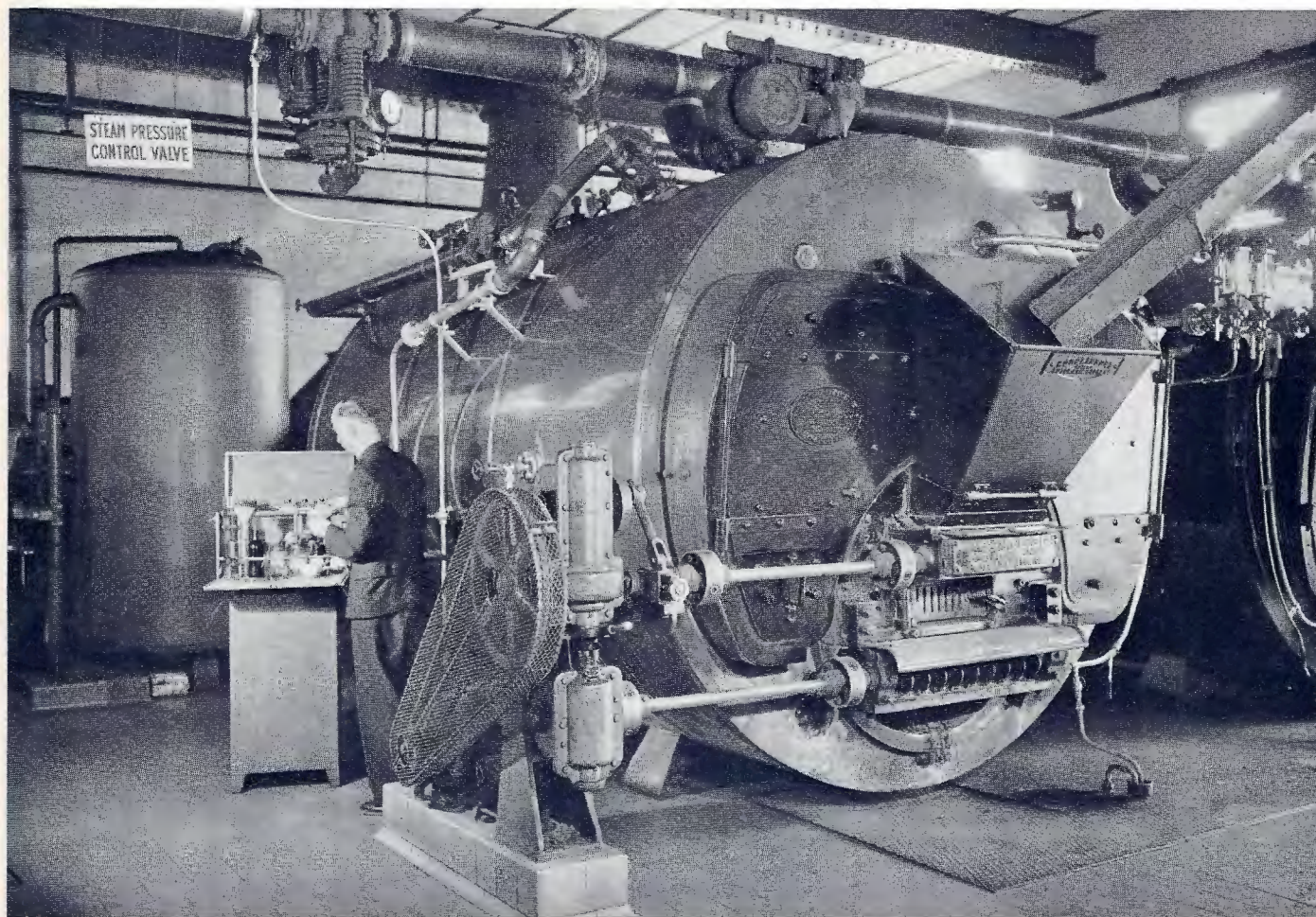


A large water-softening plant using lime, soda ash and sodium aluminate. The water from this plant is fed to railway locomotives after a daily test.



(By courtesy of A. Gallenkamp & Co. Ltd.)

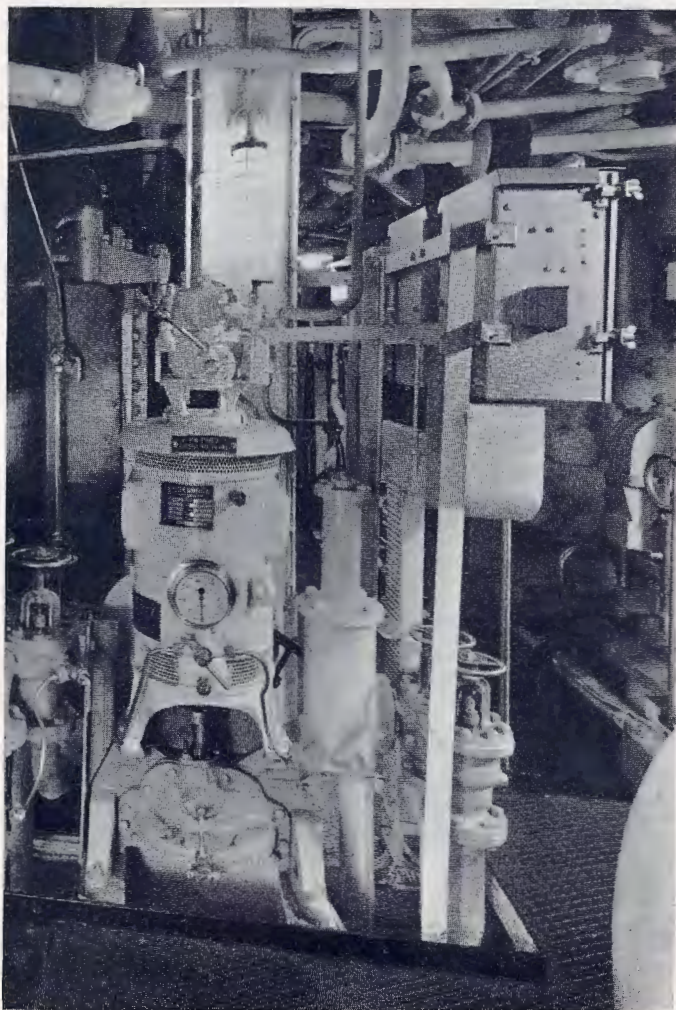
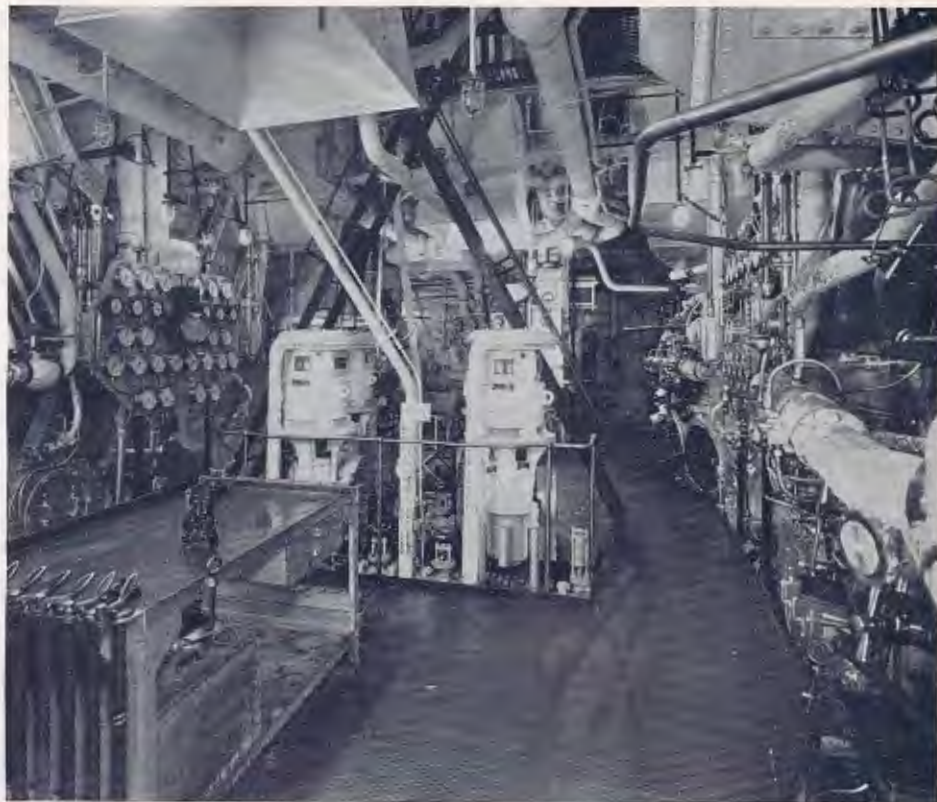
Three pieces of Water Treatment Service equipment. (ABOVE) An 'Alfloc' briquette, which is fed by (CENTRE) an 'Alfloc' bypass feeder into the water supply. In the Western Section of Southern Region, where the water supply is particularly hard on boiler tubes, there are twenty such treatment points with four analytical control points to keep locomotives running instead of being laid up for maintenance. (RIGHT) A test kit, originally designed for use at sea (everything clips into place to prevent breakages in rough weather). This equipment, now becoming popular in industrial plants, can be used by 'Alfloc' customers to carry out their own tests.



An 'Alfloc' representative, using a portable test kit, examining water samples from a boiler. He can diagnose boiler trouble on the spot, without the delay of sending samples back to the laboratory

and awaiting results. Analysis of waters on site is an essential part of the survey which the Alfloc Water Treatment Service makes before formulating their detailed recommendations.

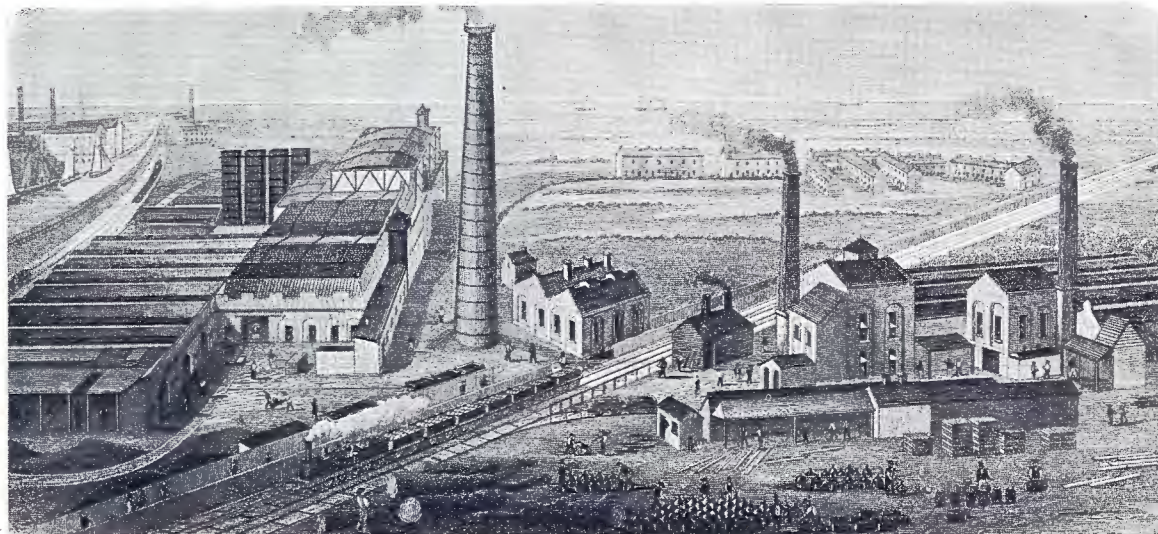
(RIGHT) The boiler room of T.S.S. Chusan, the latest addition to the P. & O. fleet with (BELOW) the liner's distilling plant. The Chusan is one of the most recent 'Alfloc' marine customers. An 'Alfloc' representative was on board the Chusan during her sea trials to check the use of 'Alfloc' chemicals in the liner's boilers and to train the engineering staff in the methods of testing and controlling the treatment. 'Alfloc' representatives also visit ships using the Alfloc Water Treatment Service, and an entry is made in the log of treatment given or suggested. Overseas representatives find their entries extremely valuable when the ship calls in their territory. In the distilling plant water is purified by distillation before being fed into the main boilers. The 'Alfloc' treatment is fed directly into the boilers to guard against scale and corrosion.



Drying cardboard between heated rollers in a board mill. Water used in the manufacture of paper or cardboard must be sterilised to prevent the growth of slimes in the plant. Here chemicals produced by General Chemicals and Dyestuffs Divisions are employed.

Glimpses Into the Past

2. Some Pioneers of the Alkali Industry



Ninety years ago—one of the oldest of the Widnes chemical works

Engraving by J. H. Cole, S. C. 1881

Last summer Widnes, where the senior General Chemicals Division factories are situated, celebrated its centenary of chemical industry; and in a memorable speech Sir Frederick Bain, M.C., Deputy Chairman of I.C.I., gave an account of the first chemical manufacturers there. This article endeavours to paint a fuller picture of these chemical pioneers. Just what sort of men were they? The answer is given to you in a digest of part of Dr. D. W. F. Hardie's forthcoming book "A History of the Chemical Industry in Widnes."

THE General Chemicals Division of today is directly descended from a handful of men who a hundred years ago had the foresight and initiative to meet the alkali needs of young industrial England. The demand was twofold. On the one hand the concentration of a growing industrial population in the towns greatly increased the demand for domestic soap, for the making of which soda has been used in one form or another since Roman days. And on the other hand soap was also needed in increasing quantities for the washing of fabrics in the cotton mills. This expanded demand for soda was answered by the energy of certain individuals, and it is the purpose of this article to study the manner of that answer and the character of some of the men who gave it.

When James Muspratt left Dublin in 1822 for Liverpool to produce soda ash there instead of the prussiate of potash he had been making on a small scale in Dublin, the soap industry was obtaining alkali from two primitive sources—burnt seaweed or kelp, and barilla, which was the ash of a particular plant grown specially for this purpose in Spain. In both the percentage of alkali was very low.

On arrival in Liverpool, James Muspratt was a young man of 29. He had an adventurous story behind him. He made his first acquaintance with chemistry as a boy of 14 when apprenticed by his parents to a Dublin apothecary. Four years later, in 1811, when Wellington began to push back the armies of

Napoleon in Spain, young Muspratt, by then an orphan, left his Dublin job and set out for adventure there. Failing to get accepted for a cavalry commission in the army he joined the navy, but eventually deserted at Swansea with the rank of second lieutenant. His desertion was no doubt prompted by a desire to settle with his lawyers over the modest capital to which he was heir. This he invested in a process for making prussiate of potash in a Dublin backyard, where he worked until he left Dublin for Liverpool in search of larger markets and wider opportunities.

Young James Muspratt may be presumed to have known about—although there is no record of this—one William Losh, who was the first person to have made soda ash in England by the French process. This process was invented by the surgeon Leblanc, who, after developing it under the patronage of the Duke of Orleans and after setting up a factory near Paris, found himself deprived of his venture during the French Revolution, with the result that he committed suicide in penury during the Napoleonic Wars. Losh took advantage of the brief truce between England and France in 1802—the Peace of Amiens—to make himself acquainted with the Leblanc process and to start it working on a very small scale at Walker-on-Tyne, where previously he had been making some kind of alkali by a process invented by his partner the Earl of Dundonald (Archibald Cochrane).

Muspratt, in search of wealth, saw the potentialities of the Leblanc process if only he could persuade the soap manufacturers to substitute, for kelp and barilla, his black soda ash. Two others in Liverpool, Thomas Lutwyche and William Hill, were already producing soda by the Leblanc process. But, like Losh, they operated on a small scale and like him met with marketing difficulties. Muspratt's greatest significance in the infant soda industry is that he opened up a market for the artificial commodity. He had no particular technical genius. What he did have was an aggressive campaigning spirit which he exploited to the full to sell his product.

In 1823, in a factory at No. 289 Vauxhall Road, Liverpool, Muspratt went over from prussiate of potash to making soda by the Leblanc process; he then went personally to the soap-makers with his new product, explaining its advantages, demonstrating its use, and even, it is said, giving it away free. In later life he used to emphasise the conservative reluctance of these manufacturers to try something new; but in the end its undeniable advantages, both in cheapness and efficiency, won the day against the vested interest of the barilla and kelp trades. The success of the Vauxhall Road factory was established.

Success, however, was only won at a price—and that price was the contamination of the countryside by the fumes that issued from the chimneys of the new chemical factory, so much so that vegetation withered and trees were killed. Now it was not callous indifference to the amenities of his neighbours that led to the situation where Muspratt, within five years of starting the Vauxhall Road works, was charged in Liverpool with committing a public nuisance.

To appreciate this it is necessary to have some understanding of the Leblanc method of producing soda. The ingredients of the process were four: salt, sulphuric acid, crushed limestone and coal. The first stage was to produce sulphuric acid, or vitriol as it was called. The traditional method was to use sulphur imported from the deposits in Sicily, but later the



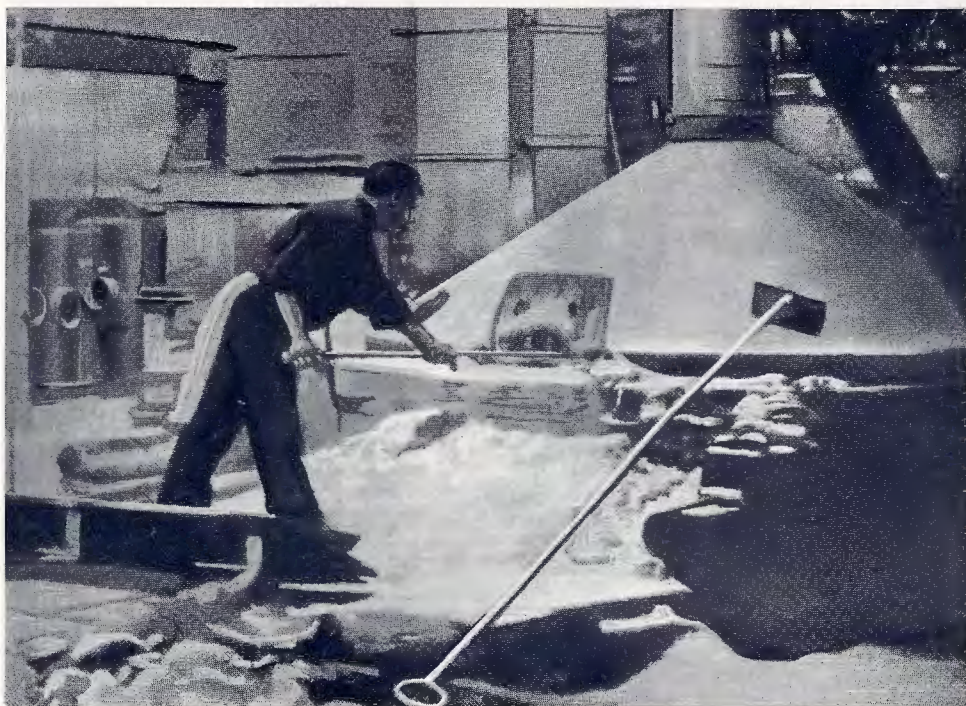
James Muspratt, 1793-1886

imposition, by the King of Sicily, of a crippling export tax killed this trade and sulphuric acid was thenceforward obtained from pyrites (which are composed mainly of iron sulphide) imported from Spain and Ireland. Next the sulphuric acid was heated in a furnace with salt to produce sodium sulphate or saltcake—a process described before the Lords' Committee on Noxious Vapours of 1862 as follows:

He (Muspratt) took common salt, put it into a furnace made of brickwork, a reverberatory furnace, so arranged that it had a fire at one end and a communication with a chimney at the other; he laid the salt on the floor of the furnace; he then ran upon it sulphuric acid, and an immediate decomposition took place, forming sulphate of soda, in which decomposition an immense evolution of muriatic acid took place; that passed through the flues up the chimney and into the atmosphere; and as muriatic acid is heavier than air, in a short time it came down on the surrounding neighbourhood.

The third stage in the process was the fusion by heat of saltcake, crushed limestone and coal. These three ingredients were raked by hand in furnaces until they "balled" and formed a black mass.

Originally this black soda ash was sold to the soapmakers just as it



Discharging a saltcake pan



John Hutchinson, 1825-1865

was taken from the furnaces. In this form it contained about 20% of soda. Later, however, the black ash was treated with water in extraction tanks and a crystallised product obtained by concentrating the solution. The material left in the extraction tanks was alkali waste, of which more than two tons was produced for every ton of soda made.

In 1828 Muspratt was warned on payment of a one shilling fine that his chimneys must cease to spread acid fumes over the land of his neighbour. At first he thought he could remedy the evil by building even higher chimneys, thus hoping for such dispersion of the fumes that their pernicious effects would be nullified (or at least deposited in another area!). But success did not come this way, and a monster chimney which Muspratt began erecting several years later collapsed before completion.

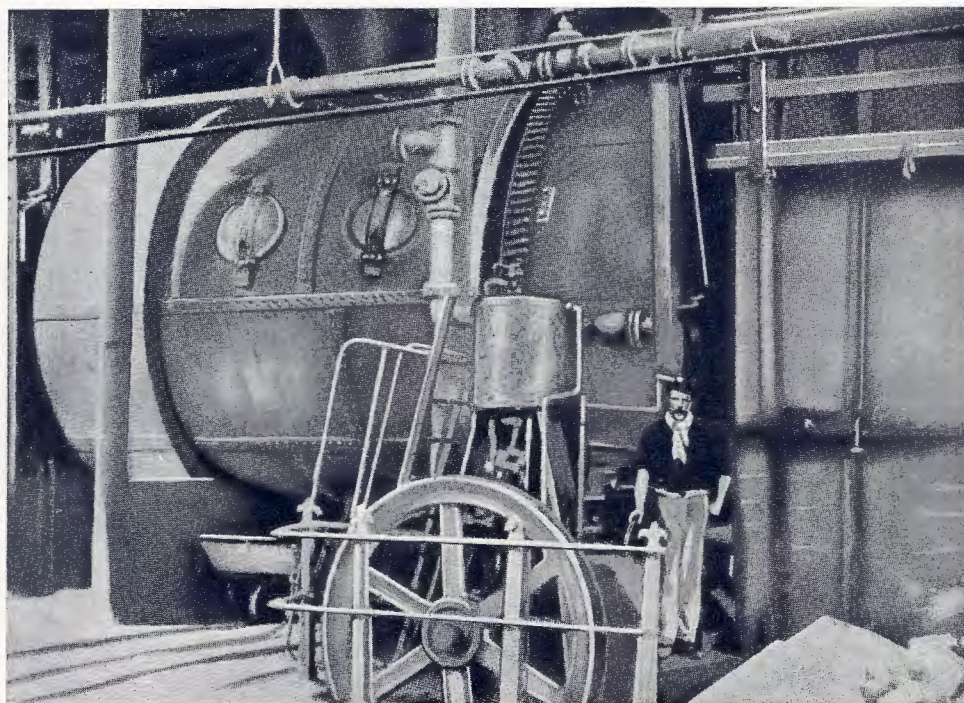
Meanwhile another pioneer manufacturer of soda, William Gossage of Lincolnshire, like Muspratt a former apothecary's apprentice, was, at his small soda works near Stoke Prior in Worcestershire, confronted likewise with the angry recriminations of his neighbours. Now Gossage was an inventor—in fact he took out his first patent (an alarm clock device) at the age of 24, and more than fifty patents are recorded under his name. He turned his inventive genius to the problem of muriatic

gas fumes, and one of his experiments was to fill a disused windmill with gorse and bracken, saturate the scrub with a trickle of water (just sufficient to keep it moist) and then introduce muriatic acid gas at the top, which being heavier than air slowly descended to ground level. Gossage found that by the time the gas had reached the bottom of the windmill tower the bulk of it had dissolved in the water. In so doing he had discovered the remarkable power of water spread thinly over a large surface—as opposed to water in bulk—to absorb gases, and had invented the first absorption tower, which enabled the alkali manufacturers to capture the muriatic gas before it escaped into the air.

Gossage's windmill absorption tower was the father of all absorption towers in the nineteenth-century alkali works. It did not merely mitigate the nuisance hitherto caused by the escape of muriatic acid—it almost completely eliminated it. The 1863 Alkali Act, which made the escape of muriatic acid gas a civil offence, would have been impossible to implement in practice without the existence of such absorption means. Careless working—and this was not infrequent—was the chief cause of atmospheric pollution by muriatic acid after about 1840. And it is somewhat ironical to read that Gossage, when making saltcake in Widnes in 1852, neglected to construct one of his own absorption towers—a fact which was pointedly mentioned in evidence before the Noxious Vapours Commission.

However, the absorption tower was only a partial solution to the problem. The real solution, ultimately to be found by Ernest Solvay of Belgium, was the industrialisation of a French chemist's discovery that salt could be converted by means of ammonia and carbon dioxide into bicarbonate of soda. Solvay brought his engineering knowledge to solve the technical, as distinct from the chemical, problem of how to avoid losing the ammonia used in this process, ammonia being an expensive commodity, even though, with the advent of gas lighting and the consequent production of coke, no longer a rare one.

Undeterred from expansion by all these difficulties, Muspratt



A black ash revolver with its steam-engine drive



Henry Deacon, 1822-1876

opened in 1830 a new soda works at Newton, near St. Helens. Here he was near to the glass industry, already established at St. Helens for more than a hundred years so far as bottles and sheet glass were concerned. Glassmaking was a growing industry making increasing use of soda and saltcake, although never comparable to the soap industry as a market for soda.

Others were soon to follow Muspratt's lead. In 1847 John Hutchinson established a soda works at Widnes and thus is entitled to be regarded as the father of the Widnes chemical industry. Hutchinson affords a fine example of rugged Victorian enterprise. The son of a naval officer who became, on retirement after the Napoleonic Wars, a shipbroker in Liverpool and agent for Lloyd's, young Hutchinson learned his chemistry in Paris and then, after a short time working in a factory at St. Helens, decided at the age of 22 to launch on soda manufacture for himself. He bought land at Widnes, where the conjunction of rail and canal facilities so close to the inexhaustible salt mines of Cheshire afforded such an advantageous site for the opening of a chemical works. Here he carried on the established soda process of his time.

Although Hutchinson may have followed a path already trodden by others, nevertheless he applied to the manufacture of soda a drive and a business enterprise which greatly expanded the industry within a few years. For Hutchinson was pre-eminently a business man and a clever one—"the cleverest man I have ever known," as Ludwig Mond was one day to say of him. He built up at Widnes what might be described as an industrial estate, developing the amenities of the site and leasing it out to other manufacturers. He cared little for chemical experiments. No patents stand under his name. He was out to develop the industrialisation of a process already proven, not to explore unknown avenues of research. Nevertheless he was alert to the prospects of gain in any new

developments, as is shown by the fact that he quickly saw the potentialities of Mond's patent for the recovery of sulphur in alkali waste and gave the young German chemist facilities at his works to develop his process.

He built up a large-scale business which shortly after his death made a profit of £40,000 in one year alone when trade was resumed with the United States at the end of the American Civil War. But Hutchinson became a sick man. He was one of two brothers who all, like their father, died of consumption. He himself became ravaged with the disease in the last few years of his life and died at the early age of 40.

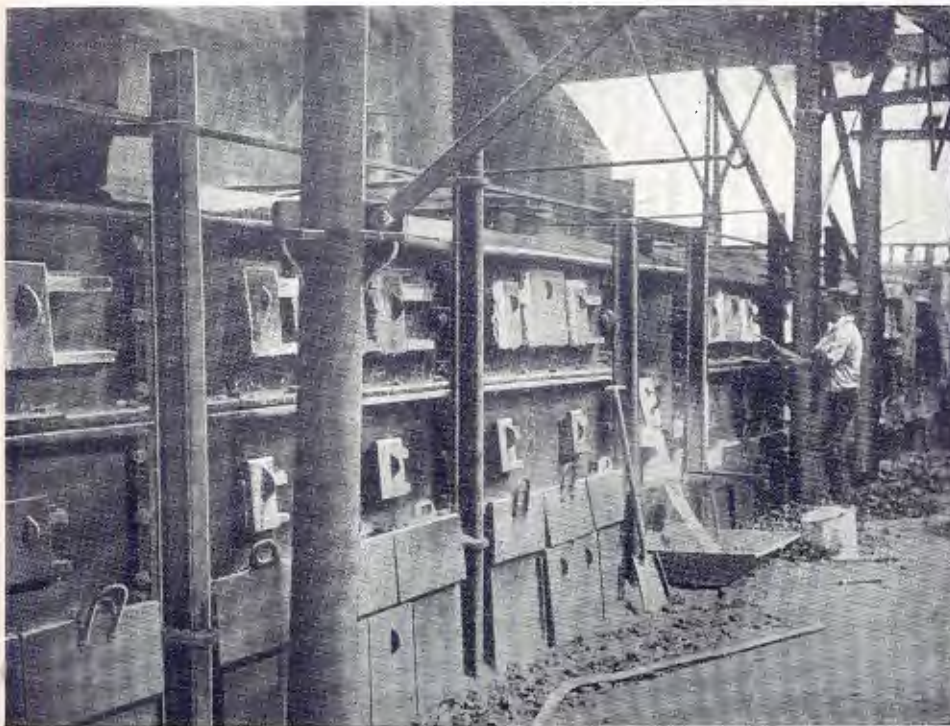
Meanwhile new figures were appearing. Muspratt, his Newton Works firmly established and his sons trained to take his place, withdrew more and more to seclusion, travelling from time to time extensively on the Continent. At Seaforth Hall, a large mansion he built himself overlooking the sands near Liverpool, he used in the early years to entertain famous names of the stage and literature—among them Charles Dickens; Mark Lemon, the first editor of *Punch*; and Charles Macready, the Shakespearean actor. But with the death of his wife he lived there very quietly and gradually took less and less interest in the works. Thus he left the further expansion of the alkali industry to younger men and in particular to his sons, of whom two started up soda works on their own—Frederic at Widnes and Richard at Flint; a third, Edmund Knowles, managed for a time his father's Liverpool and



William Gossage, 1799-1877

Newton Works; while the eldest, Sheridan, founded the Liverpool College of Chemistry in 1848 and found his métier in teaching.

One of the most notable of the newcomers to the industry, however, was the Londoner, Henry Deacon. Deacon's career



Pyrites burners for the manufacture of sulphuric acid

was governed in the first instance by the accident of his religion, his parents belonging to that small religious sect known as Glassites founded in 1730 by Richard Glass, the minister of Tealing, a village near Dundee. Also a devout Glassite was Michael Faraday. Henry Deacon, meeting Michael Faraday at the Glassite gatherings, came to his notice when an apprentice to a London engineering firm. Under Faraday's care and encouragement Deacon supplemented his apprenticeship with evening study at the Royal Institute. He thus underwent the perfect training—practical experience combined with theoretical tuition under the leading scientist of his day.

Thus equipped, Deacon completed his apprenticeship in Manchester under the famous Nasmyth, the inventor of the steam hammer. He then took a job at managerial level at the Pilkington glass works at St. Helens, where he remained for a few years, and next went to Widnes under John Hutchinson as his first works manager. Four years later Deacon was to break away from this employer to run a rival soda works of his own only two hundred yards away just across the canal. Here the firm of Gaskell Deacon & Co. became one of the leading alkali manufacturers of Widnes. Holbrook Gaskell, Deacon's partner, had previously been in partnership with Nasmyth, but ill health had forced him to retire. General Chemicals Division

are today their successors on this site.

Also to Widnes came William Gossage. He arrived there in 1850, four years after Hutchinson, at the age of 51 with a long career of experiment behind him—soda manufacture in Worcestershire; white lead manufacture in Birmingham; copper smelting in Wales. At Widnes he established a soap factory which became famous throughout the world.

These men—James Muspratt, John Hutchinson, Henry Deacon and William Gossage—may be considered among the pioneers of the Widnes alkali industry, although there are other names also entitled to honour whose careers cannot be brought within the scope of a single article. They blazed the trail which others followed. But it would not be fitting to pay tribute to their genius without at the same time remembering the working men who laboured in the factories.

In the first half of the nineteenth century their labour was hard and long. At Widnes it was customary to work a day shift of twelve hours and a night shift of fourteen, and every other Sunday a twenty-four-hour shift. Outside the factory there was much drinking, and public houses had a special room called the "packers' hut" to which the bleach packers would repair straight from the factory without changing their clothes. Nevertheless conditions among chemical workers were less severe than elsewhere in industry. They bore small resemblance to those that prevailed in the textile factories and coal mines. Wages on the whole were good, and there was a notable absence of industrial disputes.



A bleach packer

Indeed, the chemical manufacturers of Widnes in particular were very conscious of their duties to the community that grew up around their factories. To them must go the credit for the early development of light, water, sanitation and education in Widnes. They gave their time unsparingly to the local Board, and perhaps no community of that time had its affairs in the hands of a body

of more distinguished and able men. They endeavoured to give continuous employment and, following the lead of Hutchinson, were slow to lay men off when times were difficult. Their record in this respect is one of which we need not be ashamed.

Information Notes

CENTRAL LABOUR DEPARTMENT: ITS POLICY AND ORGANISATION

Contributed by Central Labour Department

Each of the four organisations which amalgamated in 1926 to form Imperial Chemical Industries Limited had, of course, a labour policy, but, as might be expected, these policies differed in many respects. It was early decided by the Board that in the new enterprise there must be a common labour policy and that this policy should be to secure the confidence and active co-operation of the employees and to inculcate in their minds a sense of partnership in the undertaking. In the words of the first Chairman, the policy should be "directed to build up an I.C.I. morale, as distinct from a purely local patriotism" and "the Company's relations with its workers should be founded on a common policy applicable throughout, it being the Board's view that the matter of our relations with our employees, being of such paramount importance, could not be dealt with by reference to the effect on any particular group, but must be governed by the position as a whole."

The adoption of such a policy naturally called for a co-ordinating body, and shortly after the formation of I.C.I., therefore, a Central Labour Department was set up to give effect to the Board's decision to establish a common labour policy throughout the Company.

In the early days the Central Labour Department was chiefly concerned in the implementation of policy and with the vast amount of work involved in the creation and introduction of the many important schemes which are now so well known to employees and which provide the practical manifestation of that policy. Latterly it is perhaps true to say, so sound was the foundation then laid, that the department is now mainly concerned with the administration of those schemes and with seeing that everywhere within the Company the labour policy is well understood and carried out in the spirit in which it has been formulated.

The department works in close contact with other Central Service Departments and in particular with Central Staff Department, Pensions and Assistance Funds Department and the Principal Medical Officer's Section, all of which, like the Central Labour Department, are responsible to I.C.I. Personnel Director. The department also keeps in close touch with the Divisions, and thus they are made aware of I.C.I. Board's policy on labour matters and are enabled to give expression to their views in the formulation of that policy.

The Chief Labour Officer, who is directly responsible to I.C.I. Personnel Director, is the head of the Central Labour Department. That department has a staff of twenty-eight people and is divided into the following sections, which, in the nature of the work, cannot be rigid and self-contained yet achieve a convenient division of responsibility: Industrial; Welfare, Works Councils and Canteens; Job Analysis and Assessment; Industrial Psychology; Information and Statistics.

The department, as one of the Central Service Departments, provides in the main a consultative and advisory service, but in one important aspect of its work, namely in trade union matters, which are the chief concern of the Industrial Section, it has an executive responsibility. In 1936 and 1937 far-reaching agreements were made collectively with the principal trade unions for the establishment and subsequent regulation of standardised basic rates and uniform working conditions. Any changes in basic rates or conditions are negotiated with the trade unions by the Central Labour Department. When in any factory an issue arises, the agreed negotiating procedure operates. In brief, a local conference is first held; then, if there is failure to agree, an intermediate conference ensues at which a member of the Central Labour Department and of the headquarters of the trade union concerned are present; if there is still failure to agree, then a headquarters conference is held between the headquarters authority of the trade union or unions and the Central Labour Department. The negotiating procedure provides that only after failure to agree has been formally recorded by a headquarters conference may notice of a strike or lock-out be tendered by the respective parties.

The Welfare Section of the department co-ordinates all the activities within the Works Council Scheme. The Company early recognised the value of joint consultation and can be justly proud of the formal machinery evolved. The "high spot" of the scheme—the Central Council—enabling representatives of management and workers of all parts of I.C.I. to meet together twice a year, is really in the nature of a family gathering at which there are free and frank discussions on matters of mutual interest and where those present hear statements on Company policy direct from those charged with the ultimate responsibility in I.C.I. The Welfare Section, too, conscious that good industrial relations can only be expected against a background of good physical working conditions, has been closely concerned in the laying down of standards, and high standards, in such matters as safety, conditions of environment, amenities, clothing, and so on, and endeavours to ensure that these standards are put into effect as circumstances permit. Not least among its activities, the Section, through the Company's Chief Catering Adviser, guides the canteen service throughout the Company in the provision of attractively designed and decorated canteens and equipment and in the supply of well-cooked and well-balanced meals at a low charge.

The Job Analysis and Assessment Section has as its first responsibility the care of the wages structure of the Company. Perhaps few things are more likely to lead to lack of harmonious working than inequitable payments between one job and another, or, on a wider basis, between one factory and another. Only recently, under the jurisdiction of this Section, a Job

Appraisal Scheme was developed and introduced for general workers' jobs throughout the whole organisation, whereby job rates might bear fair and equitable comparison with one another, thus making for a sound foundation for the wages structure.

The Industrial Psychology Section is mainly concerned with advising on such matters as interviewing technique and selection procedure with a view to ensuring that a man's capacities match the requirements of the job, so that as far as is possible there will be no square pegs in round holes.

In the Information and Statistics Section is done that painstaking task of compiling tables and charts from which trends can be deduced and of keeping abreast of changes of policy and developments in other companies in this country and abroad.

Such a brief account of the structure and function of the Central Labour Department is necessarily factual, yet in labour matters it is not enough to have good schemes, however good they may be. Of greater importance is the attitude of mind behind the schemes and the spirit in which they are administered. There is abroad today a more widespread recognition of the needs and aspirations of employees for security, for opportunity of advancement, for participation in the Company's activities, and for knowing and feeling that they count as individual human beings who are doing a worth-while job for a worth-while company; and the Central Labour Department is fully aware of its share in the responsibility for the well-being and contentment of all workers throughout the Company.

I.C.I. AT CHICAGO TRADE FAIR

By W. J. Marrable, (Exhibitions Section)

"World Trade—World Prosperity—World Peace" was the laudable theme of the First United States International Trade Fair, held at Chicago from 7th to 20th August, at which I.C.I. presented an exhibit worthy of its industrial importance. Whether this exhibition will contribute to world peace only time can tell, but perhaps it is not inappropriate to mention here that neither Russia nor any of her satellite countries were represented. Certain it is that whether orders were exchanged or not, many friendships were made which in themselves may influence a better understanding between peoples of many nations.

There were altogether some twelve to thirteen hundred exhibitors, of which about forty were British, occupying approximately 17,500 square feet of space. Of this I.C.I. had 1600 square feet. When the I.C.I. management decided to take part in the exhibition it was agreed that only those products with fair prospects of selling in the American market should be shown. First choice was naturally dyestuffs, for here was an excellent opportunity of supporting our newly acquired American Company, Arnold, Hoffman & Co. Inc. of Providence, Rhode Island.

Dyestuffs therefore received the major part of the show, for which we had a fine centre-piece in the form of the seven dioramas illustrating various periods in the development of colour. These were originally produced for the 1948 Dyestuffs exhibit at the British Industries Fair. They were displayed under the title "In Search of Colour" and formed the introduction to the present-day application of I.C.I. dyestuffs for various types of fabrics, leather, etc. Other products displayed were chemicals from Billingham and General Chemicals

Divisions, Alkali Division products, explosives, explosives accessories and other products of Nobel Division, non-ferrous metals, sporting ammunition, Marston heat-exchange units and ceramics of the Metals Division, 'Perspex' in plain and coloured sheet form from Plastics Division, and some selected products of Plant Protection Ltd.

The entire stand, with the exception of some of the product displays, was designed and built in England and shipped in railway containers for installation on site. Post-war exhibition stand design is entirely different from that of pre-war days. Today some of the I.C.I. exhibition stands require three to four weeks' building time in the shop and two weeks for installation on site.



I.C.I. Stand at Chicago Trade Fair

To ensure the arrival of our exhibit at Chicago in good time it was necessary that it should be packed ready for despatch to the London docks not later than 20th June. Imagine, then, the consternation in the Exhibition Section of Central Publicity Department and at the contractor's workshops when on 16th June a cable was received from Chicago informing us that the Coliseum hall, in which our exhibit was placed, was not being used, and that we were transferred to the international amphitheatre, and in a position with a ceiling height of 16 feet. As the height of our stand was approximately 14 feet, we made it clear that the new location was not suitable, and that something must be done about it. Eventually we were allotted a site in the arena of the amphitheatre, where the ceiling height was 73 feet, but at such a late stage the change was worrying, to say the least of it.

Owing to a slight diversion from the working drawings some of the ceiling sections had to be altered, and this affected the

progress of the electrical installation, which was a very complicated one. We were anxious to avoid as much overtime work as possible, for the overtime rates of pay for carpenters and electricians was a little over 8 dollars an hour, which is something like £2 14s. an hour in sterling. Incidentally, on more than one occasion I was grateful for the lift given me by one of our electricians, who drove me from the Exhibition Hall to my hotel in one of the latest type fluid flywheel Buicks. His foreman had a Packard, I think.

Naturally, we met some of the usual last-minute difficulties which always crop up at every exhibition. At home they can be met with reasonably equanimity, for all the services of the contractor are at the end of a telephone line. It is by no means so simple when you are 5000 miles from home.

The Fair was not well attended by buyers at the amphitheatre, although public interest was considerable. The Saturdays and Sundays were public days, and good attendances were recorded, although the crowds were very much larger at the Navy Pier, where consumer goods were exhibited.

The I.C.I. exhibit earned high praise from all quarters, and there is no doubt that it established a new standard in American exhibition practice. The double-deck idea had certainly never been used in the amphitheatre, and some of our American friends freely admitted that we "had something" which they had never attempted. It will be interesting to see if they adopt it, and to study the influence of British design on next year's Chicago Fair.

SCOTTISH RAILWAYS

In the following note Mr. Henry Maxwell contributes a review of "Scottish Railways," by O. S. Nock, B.Sc., A.M.I.C.E., M.I.Mech.E. (18s.), recently published by Thomas Nelson & Sons.

Quite apart from the perennial interest which railway engines and railway matters in general arouse in the majority of men both young and old, I.C.I. itself has, as it were, an extensive professional interest in a wide variety of railway activities. Paints for rolling stock, copper for fireboxes and tubes, water-softening for locomotive boilers, and plastics for interior decoration of railway coaches are but a few outstanding examples which jump to mind. And within the ranks of I.C.I. are not a few railway "amateurs" of distinction and authority, whose contributions to the *Railway Magazine* and other journals are widely read and quoted. It is not, however, to railway fans alone that the latest volume from the pen of Mr. O. S. Nock, who is, by the way, the chairman of the Editorial Committee of our distinguished contemporary, the *Westinghouse Review*, the house journal of the Westinghouse Brake and Signal Co. Ltd., will appeal, for Mr. Nock has blended his wide knowledge of the engineering and technical aspects of his subjects with a most compelling and inspiring appreciation of the picturesque and the romantic.

"There is a strong though somewhat indefinable fascination about Scottish Railways," Mr. Nock begins, "a fascination that is stimulated by the Scottish environment," and thereafter, with infinite zest and appreciation, in innumerable contexts throughout the book, he pursues that fascination.

In fact, Mr. Nock has chosen a noble theme, and he has made good use of it. The first chapter starts off with a short and very readable historical preamble, as it is termed, in which the author traces the projection of the two great trunk



(By courtesy of Thomas Nelson & Sons Ltd.)

A Northbound special express leaving Blair Atholl

routes of Anglo-Scottish approach, the East and West Coast lines from Kings Cross and Euston respectively, and throws interesting light upon the origins of the deadly and persistent feud between the Caledonian and the Glasgow and South Western companies. He stresses the widely divergent character of the Scottish railway lines according to their geographical location, and contrasts the Highland Railway, which, with a main line only twenty miles shorter than that of the London and North Western from Euston to Carlisle, required for its operation a bare 150 locomotives against the latter Company's 3000!

The glamorous Clyde with its combination of train and steamer routes is rightly given a chapter to itself, and a worthy chapter at that—Mr. Nock is not one to miss his opportunities—as are the various and outstanding engineering and architectural features of railway operation in Scotland, culminating in a description of the well-nigh incredible situation which faced the East Coast engineering departments after the great floods of 1948. Traffic control and signalling are dealt with in a manner which, while fully satisfying to the serious student, retain the interest of the general reader. We learn, for instance, that it was the practice of the former Caledonian, North British and Glasgow and South Western Railways to use a truly green glass in the spectacles of the signals. Most railways adopt a strongly bluish tint of green in order at night to counteract the yellow in the light from an ordinary oil-burning signal lamp. On the Scottish lines the light displayed at night was often almost yellow instead of the orthodox bright green. Significant of climatic conditions, the practice of the Highland Railway was to carry the signal wires from cabin to mast at a height of six feet above the ground!

As is to be expected from so keen and faithful a student of locomotive matters, the chapters which deal with the building and operation of locomotives in Scotland are of outstanding interest and sympathy. Mr. Nock is no blind partisan, but like everyone else he has his enthusiasms, and few indeed will be able to resist sharing them. For here again the peculiar fascination, the well-nigh unique attraction, of things Scottish makes itself apparent. The locomotives, as Mr. Nock points out, which were built in the great Drummond tradition for the railways of Scotland were no more ornate, no more graceful in outline than their English counterparts on the London and South Western and elsewhere, and certainly not superior in

hill-climbing to their contemporaries on the North or the Great Western. But respected and admired as may have been a South Western "greyhound," a North Western "George" or a Great Western "Star," who can pretend that they have ever basked in the fabulous light which has for so long invested a "Ben," a "Dunalastair" or the legendary "Cardean" herself?

And surely there is a lesson to be learned from the very virtuosity of the locomotive engineers who presided over the destinies of those Scottish railways? Small systems, many with very limited traffic yet intensely competitive as they were, it cannot have been mere chance that they should have produced a succession of the very greatest names in the history of British railways—Alexander Allen, William Stroudley, Peter and James Stirling, David Jones, Dugald and Peter Drummond and others only less well known. Here, as so often in history, is found the small, the individual, the highly combative and competitive society producing its altogether disproportionate outcrop of artistry and genius. It must remain to be seen whether the unified system that has taken the place of these several and no doubt basically uneconomic units can be a match for them in sheer achievement of invention.

Mr. Nock makes everything live. His description of how a keen engineman took in hand a notorious "dud" member of a batch of Gresley "Pacifics" at Haymarket shed and, by devoted observation of her peculiarities, was able to diagnose and, with the assistance of a maintenance staff as keen as himself, to remedy her various ailments so that a short while afterwards she was specially selected to haul the Royal Train is a magnificent story, and it is only one of many. The various train logs and notes comprised in the appendices, covering the author's own experiences on the footplate over most of the great trunk routes in Scotland, form a valuable factual record of the actual locomotive running on these lines which will become even more valuable as the period in which they were recorded, the period still of individual enterprise and endeavour, recedes into history.

TRADE WITH TURKEY

Contributed by Near East Department

With the end of the war in Europe a large potential market for I.C.I. products—estimated at £3½ to £4 million per annum—was opened up due to the elimination of German competition which pre-war held a predominant position with approximately 60% of the total imports. There was an insatiable demand for dyestuffs, explosives, alkalis, fertilizers and Plant Protection products. Unfortunately, owing to the difficult supply position in the United Kingdom in the immediate post-war period, it was impossible for I.C.I. (Turkey)—the selling organisation established at Istanbul in 1941—to take full advantage of the favourable conditions. Nevertheless great progress was made and in 1948-9 the total turnover reached a record figure of £1,107,000.

With the industrial and agricultural expansion of Turkey, coupled with the improving supply position in Britain, further progress was expected, but unfortunately the reverse has proved to be the case. The reasons for this are quite simple. Firstly, there is a great shortage of sterling available to finance purchases in Britain. This is due to the fact, that, in general, prices of Turkish products available for export are too high for British buyers and in addition a large proportion of available sterling resources has to be allocated to servicing

British wartime loans to Turkey. Secondly, there has been an alarming recrudescence of German competition. Not only have the Western German authorities purchased large quantities of Turkish produce (chiefly tobacco, cotton and dried fruits), but also German exporters appear to be prepared to accept prices 30-50% below British prices and at the same time they can frequently offer quicker delivery. As a result import licences are readily obtained for German goods and only with the greatest difficulty for British goods.

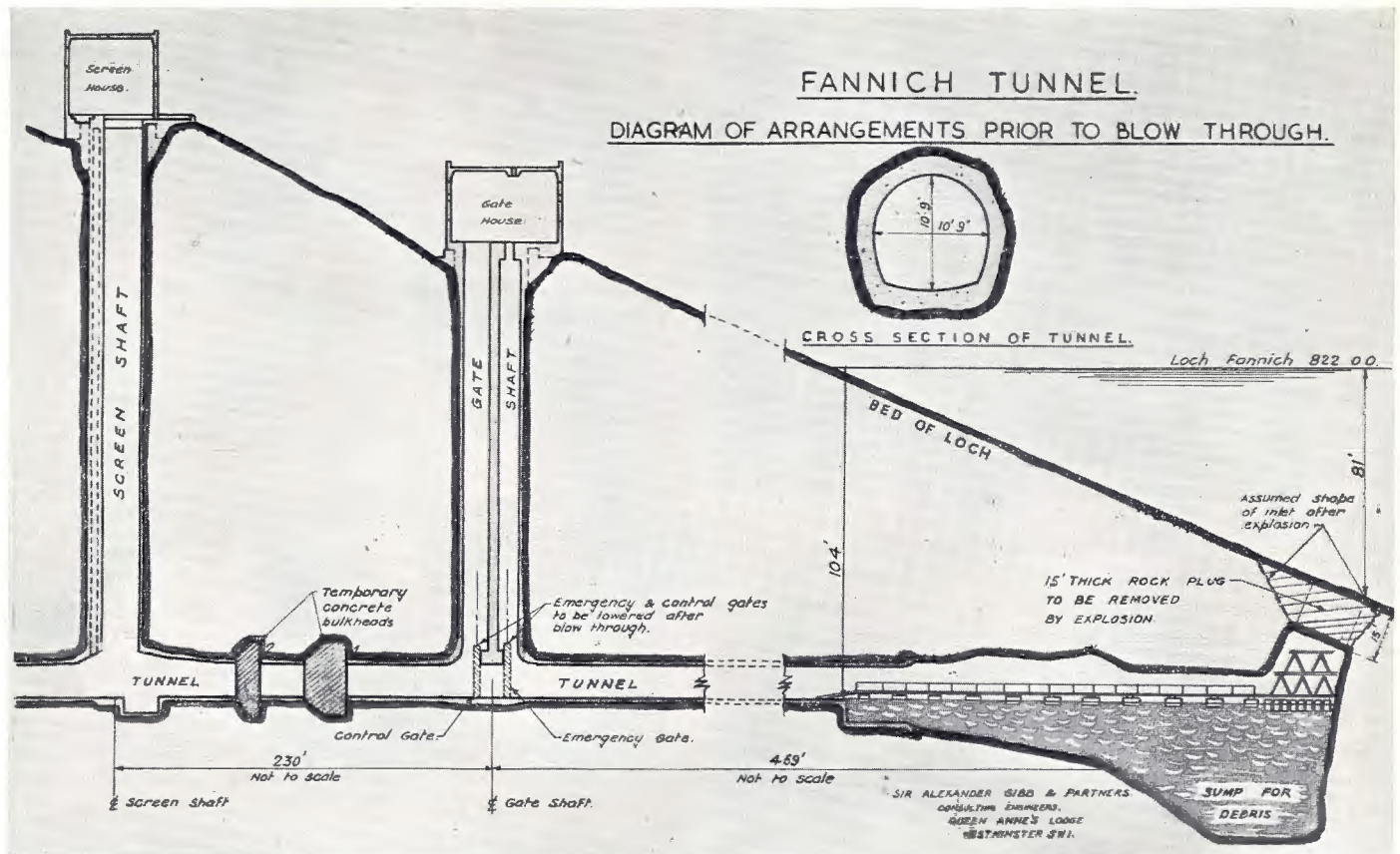


In the past decade Turkey has made a great advance in industrial development, and today she has an important textile industry, a steel plant (built by a British firm) which caters for nearly half the country's requirements, two large paper mills, a chlorine plant and a superphosphate plant, all owned by the Government. Furthermore, an ambitious plan of industrial and agricultural development has recently been launched, financed largely from Marshall Aid funds. The mineral wealth of the country is also important. Chrome, coal, copper and iron ore are all found in abundance and are already being exploited. There are also indications of oil deposits in the south-eastern regions, and extensive drilling is being carried out.

Turkey, however, remains primarily an agricultural country, and more than 80% of the total population is occupied on the land. The most important agricultural products are cereals, leguminous crops, cotton, tobacco, sultanas, figs and opium.

The cost of living in Turkey is very high—approximately five times as high as in 1939. This is mainly due to the crippling taxation and very high import duties levied by the Government in order to raise the revenue required for normal purposes and in addition to maintain armed forces on a scale disproportionately high in relation to the total population. The proximity of Russia, who has subjected Turkey to an unrelenting war of nerves during the past few years, has resulted in the maintenance of 1,000,000 men under arms in Turkey, for which purpose approximately 40% of the total Turkish budget has to be used.

In the general elections held in May this year the Democratic Party scored a sweeping victory over the People's Party, which had been in power since the war. This gives rise to hopes of a more liberal policy, with greater scope for private enterprise in industry and reductions in taxation and cost of living. The foreign policy of the new government is, however, fundamentally the same as that of the opposition—adherence to the United Nations and the European Recovery Programme.



A diagram of the hydro-electric tunnel at the point where it connects with the bottom of Loch Fannich

POWER FROM LOCH FANNICH: AN UNUSUAL BLASTING OPERATION

Contributed by Nobel Division

Shortly after midday on 7th September an underwater explosion in Loch Fannich, which lies among the lonely hills of Ross-shire some forty miles west of Inverness, shattered the rock plug separating the loch from the long tunnel which will convey water to a new hydro-electric generating station at Grudie Bridge nearly four miles away.

Lady MacColl, wife of Sir Edward MacColl, vice-chairman of the North of Scotland Hydro-electric Board, pressed a button which closed an electric circuit and released the energy from an exploder to fire special underwater charges embedded deeply in the last rock face. For the spectators, some of them sheltering in a temporary pavilion facing the loch, it was a dramatic moment of suspense as the earth trembled slightly and they heard the explosion. A column of water rose 50 ft.. The blast had been completely successful and the tunnel was linked at last with the waters of Loch Fannich.

This method of connecting a hydro-electric tunnel through the bed of the reservoir is not often practised because it is difficult and, unless great care is exercised, hazardous. In Britain the feat has been performed only once before, when, some twenty years ago, Loch Treig was similarly tapped to provide the means of operating the turbines at the British Aluminium Company's works near Fort William. The method has been employed in Scandinavia and in the Pyrenees, but it is uncommon and demands great precision and confidence.

The plan submitted by Nobel Division Technical Service Department meant drilling 100 holes through 13 feet of rock to

within 18 inches of the loch's bed. At the same time Research Department and Blasting Department specialists worked out a special system of initiation to provide instantaneous explosion with Submarine Blasting Gelatine.

Meanwhile Messrs. Balfour, Beatty & Co's crews had been blasting the tunnel through miles of rock, until only fifteen feet separated them from the waters of Loch Fannich. Under this face the horseshoe-shaped tunnel, which is 10 ft. 9 in. across at its widest part, was enlarged to a depth of 45 ft. to form a sump designed to hold 400 tons of rock debris from the explosion. The sump was dug deep enough to hold at least twice the estimated rock fall and eliminate any risk of blockage to the main tunnel. It was then filled with water to provide a cushion against the explosion. Temporary concrete bulkheads blocked the main tunnel to withstand an explosive force of 120 tons per square foot and prevent the waters of the loch from surging forward uncontrolled after the breakthrough.

The first of these bulkheads, as expected, resisted the force of explosion; but there was also a second concrete bulkhead in reserve farther back in the tunnel. These bulkheads will be removed later, when the loch waters can be controlled by the sluices in the gate shaft.

The Loch Fannich scheme is only part of a vast project which will harness the water of the Conon basin. There will eventually be six power stations in the scheme, giving "power from the glens" at an output rate of 450 million units per annum.

Rugby—League or Union?

by W. Fallowfield



Holding the Rugby League Cup, Bath, the Warrington captain, is chaired by his team mates after they had beaten Widnes in the Cup Final at Wembley last April

Which is the better game—Rugby Union, strictly amateur, or Rugby League, thirteen a side and semi-professional? Mr. W. Fallowfield, himself a former Rugby Union player and now Secretary to the Rugby League, discusses the pros and cons of this vexed question; at the same time he explains, for the benefit of those who are not conversant with both games, just where the main differences lie.

LEAGUE OR UNION? Since occupying the secretary's chair at League headquarters I have been drawn into many arguments with supporters of both codes as to which is the better game. I must admit that there has been an apparent lack of consistency in my choice of sides in the arguments, because I have not always spoken in favour of the same game. When discussing Rugby with a dyed-in-the-wool Rugby Leagueite I support the Union game; when I join issue with a Unionist, then I am all in favour of the Rugby League.

Why this inconsistency? Because I think they are both grand games. I cannot fail to remember the many games of Rugby Union I have played in the past without experiencing a certain nostalgia. The forward rushes; the tussles in the

line-outs and even the derogatory remarks of the second row, who never failed to accuse us back row forwards of "leaning" on the pack instead of pushing; the pint of beer with one's team-mates after a hard game—all these are pleasant memories.

Which game do I think is the better of the two? I have no hesitation in saying that a Rugby League game played between two teams which play in the right spirit offers a spectacle which in thrills is second to none.

My Union friends would immediately pick me up on that statement because I have included the word "spectacle." This, they would infer, supports their arguments that Rugby League is a spectators' game, whereas Union is essentially a players' game.

With this I do not agree. During the war years I had the



Before the Wembley match Mr. Attlee, the Prime Minister, is introduced to the Widnes team

pleasure of playing Rugby Union in the Services with many famous League players—Gus Risman, ex-tour captain and now manager of Workington Town; Ernie Ward and Trevor Foster, team-mates of Bradford Northern, who have each captained their respective national sides; Allan Edwards, Salford's pre-war star left-winger; Ted Sadler, Castleford's loose forward; Roy Francis, now captain of Hull Rugby League Club; Johnny Lawrenson, ex-Wigan English International; and many others. Not one of these expressed an opinion other than that League was the better game to play. I prefer to base my opinion on theirs. It is my regret that my own playing experience at the League game was limited to intermediate football in my home town of Barrow-in-Furness. This experience is not sufficient for me to form my own opinion on this question, and that is why I would rather accept the views of players who have shone at both games.

On the other hand, I will admit that there is a certain type of player who will prefer the Union game. I refer to the typical Union second or front row forward whose one idea is to get "stuck in" and who very rarely handles the ball. He is content to toil and sweat—pushing, tackling, hacking constitute his lot—and he likes these activities. He would probably be completely lost if he were to find the ball in his hands with a few yards in which to get moving.

Here we have the basic difference between the two games. Rugby League is essentially a passing game, whereas Union still adheres more to the traditional style of close play.

Many readers are probably not conversant with the laws of the two games, and I will try to explain the amendments which have been incorporated in League football and which have widened the gap between the two games.

The Rugby League originated in 1895 at the George Hotel,

Huddersfield, when twenty Rugby Union clubs in the north of England broke away from the parent body and formed a separate organisation which they labelled the Northern Rugby Union and which allowed clubs to compensate their players for wages lost through "broken time." Their southern brethren did not favour this procedure—probably because their own players were less affected, being drawn mostly from public schools and universities and being able to afford to play a game which was tending to become a "rich man's game." Since that date the League game has been outlawed by the Union. Any player who plays League football cannot play for a Union team—that is, if this "crime" is committed by the player after he has attained the age of eighteen years, which evidently is presumed by the legislators of the fifteen-a-side game to be the age of discretion when a youth ought to be able to differentiate between what is "right" and what is "wrong."

Now, the Rugby League official evidently looks upon the scrum as an evil necessity rather than a test of strength between the rival packs of forwards. Consequently we find the laws framed so that the ball can be got in and out as quickly as possible and the main business of passing resumed with the minimum of delay. The forwards cannot push before the ball is in the scrum. The ball need only pass one foot in the front row and can emerge from the pack anywhere behind the first three down. Meanwhile the scrum half cannot follow the ball but must remain behind his own forwards until the ball is out. This gives his opposite number plenty of time to gather the ball and serve his stand-off half.

The same principles apply to the playing of the ball after a tackle. There are no loose scrums around the tackled player as in Union. Everything is much more orderly. The tackled player is released by his opponent, regains his feet facing the opponents' goal line, drops the ball in front of him, and then plays it with his foot. Invariably he heels it to an acting half-back who stands two yards behind him and who can then pass the ball to his colleagues, who are in turn three yards behind him, and hey presto! another passing movement has begun.

Unfortunately it does not quite work out according to plan every time. As the advantage is always with the tackled player, we find everything in favour of those teams which prefer to play a close game. Players sometimes prefer to be tackled rather than risk a pass, knowing that their side will retain possession. Defending sides with the ball often resort to barging tactics to gain ground, and there is a monotonous succession of "play-the-ball" movements. This aspect of play creates a problem for Rugby League officials which cannot be easily solved.

Yet another difference in the two games is that relating to "finding touch." The Rugby Union full back is a "catch and kick" expert. The Rugby League full back is a "catch and run" expert. The latter cannot gain ground by kicking the ball into touch on the full. He must first make it bounce in the field of play, otherwise it is "ball back," which means that a scrum is formed where he kicked the ball. This law discourages touch play, and we find League full backs linking up with their three-quarters in passing movements.

There are other minor differences in the laws of the two games to which I need not refer in this article, but I must mention that there are two forwards fewer in a Rugby League team than there are in a Union team. The absence of destructive winging forwards permits a variety of delightful tactics

near the scrum which are appreciated by both spectators and players alike and which more than compensate for the apparent lack of continuity in the League game.

Many readers will not agree with some of the opinions I have expressed. Others, not knowing the League game, will neither agree nor disagree. To the latter I suggest that they should pay a visit to the League grounds in the north. Go to Fartown and see the cosmopolitan selection of stars who wear the famous claret and gold jerseys and who took Huddersfield into last season's League Final. See the brilliant Australian stars Johnny Hunter, Pat Devery and Lionel Cooper linking up with Welshmen Ike Owens and Billy Banks in rapid movements which sweep from one end of the field to the other. Go to Central Park and see the mighty Wigan team in action—to my mind the most formidable Rugby combination in the world. See last year's cup-finalists, Widnes, at Naughton Park, players who almost without exception learnt their Rugby League in local schools and intermediate leagues.

I have no doubt as to the opinions which you will form.



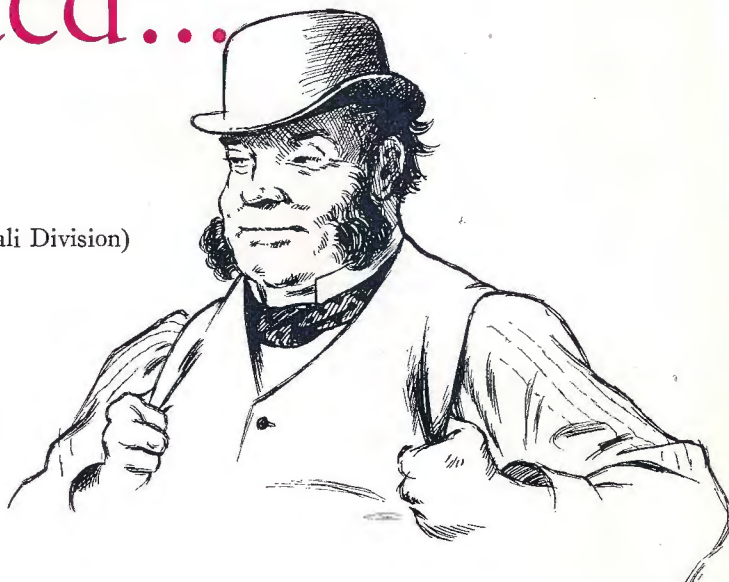
Bath, the Warrington captain, holds up the cup after the presentation by Mr. Attlee

Amos Rejoiced....

By Robin Allen (Alkali Division)



Drawings by Stan Coleman



It was very hot; but it always was hot on the day that Wheelock and District elected to hold their annual onion show.

Round about 1880 onion shows meant something. The "improved type" which is the delight of the seed merchant's catalogue was non-existent, and anybody who in those days could grow half a dozen really big onions that matched was a local hero.

Amos Bowyer grew onions, and despite the distance and all the trouble that it entailed, he and his nephew William made their way from Northwich with their precious exhibit. Not that they expected to win, because they were foreigners, and naturally Wheelock didn't want their own folks beaten, but, "If judgin' be fair and above board we conna be bate." And Amos was right. They won their class and the best exhibit in the show, and when the president's wife gave Amos 10s. in cash and two "firsts" his cup was full.

Perhaps that started the trouble. It was very hot, and a pint wouldn't come amiss to anyone. Amos and his nephew walked to the Red Lion, and Amos put down two half-crowns on the bar. "Two pints of best, please," he said; "aye, and thee can ha' one theesel' if you be so minded," he added, nodding to the landlord. The landlord pushed the change across the bar, but Amos shook his head. "Let it bide, we'll be spending it before day's out." Now, sixty years ago the beer was stronger and cheaper and 5s. went a lot further. And after all, Amos had won, and he were a right proper sort for a foreigner, and he had stood a round, so the rest of the customers stood him a round. By about six o'clock Amos' cup was indeed full.

William had been more cautious. He knew that they had a ten-mile walk before them—no distance for countryfolk in those days, but someone must take charge, and there were ports of call on the way

that needed watching. "Uncle," he said, "we'd best be going; it's a longish way if we're to get in afore dark." Amos roused himself with an effort. Beer always made him sleepy. He didn't fight or show any desire to break things; he merely wanted to sleep. However, at last they tore themselves away, and the remainder of the story may be told in William's own words.

"We didn't have much trouble until we got on to King Street. It were dusty and hot, but though the surface were good enough, King Street is very straight and it looks a long way. Uncle eyed it sadly like, and he said, 'William, lad, best bide a bit and rest like'; but I kept 'im going for a while. Then p'rhaps it were the heat, or p'rhaps it were the excitement, but more likely it were the beer, but anyhow he slumped up again me and slid on to the floor, and there he were, right out.

"I did all I knew but nothing would bring him round, and I were left to sit alongside him and see if anything would come by.

"After about half an hour I seed something in the distance coming from Middlewich, and when it got nearer I found it were a hearse. One of them old-fashioned ones what you don't see nowadays, all set up with plumes and black ostrich feathers and silk curtains and the like. I stepped into the road and stopped him and explained to him, very civil like, what had happened. The driver weren't too eager. He were coming back from a burying at Middlewich, and he had had one or two and he was the sort that gets a bit argumentative in drink.

"However, in the end he said he'd give us a lift, but there weren't room on the box for more than two, so we popped Uncle into the hearse, but the driver insisted on tying his ankles together because he said he'd always found drunks kicked as they came round.

"Once on the way with the two black horses



"It was hot, and a pint wouldn't come amiss"

zambing along I very nearly went to sleep mesel, but when I heard as we'd took the onion championship from Wheelock, and seeing as he were a Northwich man hiself, he became more friendly and talked about the gooseberry championship at Goostrey, and all the funny business that went on.

"Before very long Broken Cross come into sight with its lumped bridge over the canal, and the driver gave his team a couple of sharp cuts with the whip to help 'em over the rise. I fancy they must have been asleep, because they jumped forward and set off at near a full gallop, and the bumping and bouncing woke up Uncle.

"We heard him holloa and shout, but we didn't do nothing till we were over the bridge and the horses had steadied down again. Now, you must know that in his youth Uncle had been 'saved' and he'd always been a one for knowing religion, and when we pulled up we heard him moaning, 'I'm dead! Parson said it would happen to me, and all for supping a drop of beer. Aye, I'm dead! I cannot move me legs. I'm dead, I'm dead!' Driver and me we laughed fair proper, and driver said, 'Thee shut up, thee's not dead, and anyhow if thee is dead thou's just passed over Jordan,' meaning the canal like.

"Anyhow, I suppose the quietness after the jolting sent him off again, because we heard no more and we drove on. When we came to the Bull Ring—and it were Saturday night, remember—there were a lot of folks standing about getting a bit of fresh air before going back into the pubs again. The undertaker's business were at the corner where the chemist's is now, and when we drew up at the door folks murmured a bit and said it were not time for burynings, but when the driver climbed down from the box and

went round to the door and said roughly, 'Who's burying? I've got a dead 'un inside!' then there were a bit of a commotion, and when he opened the door and there were uncle's feet, it didn't half cause a gasp.

"By the time that the driver had untied Uncle's ankles and pulled him out by his feet, half Northwich were round us. One woman I recollect were real upset. 'It's not decent,' she said; 'it's not proper!' But I noticed she elbowed her way to the front. 'I say it shouldn't be; it's not decent handling a man like that when he's dead!'

"I suppose it were just chance like, but as the driver pulled Uncle out over the end, Uncle came to rest on his feet and leaned upright against the tailboard. This were too much for the woman. She jumped back with a little cry and said, 'Oh, it's horrible, a dead man standing like that!'

"By this time Uncle had slept off a good bit of his beer. He opened his eyes and looked round, and perhaps he remembered his early days when he were a Revealist. Anyhow, he took a deep breath and said very slowly and solemn like, 'Frien's, who's dead? I'm not dead. . . . There is no death! . . . Hallelujah! I've passed over Jordan! I'm a bloody angel!'



The president's wife gave Amos ten shillings in cash, and two "firsts"



"It's not decent," she said; "It's not proper!"



A scene in Delft, Holland

(Photo: Miss N. K. Lewis, Head Office)